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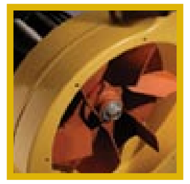

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Fine WoodWorking

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Back Cover
Arts and Crafts and Beyond

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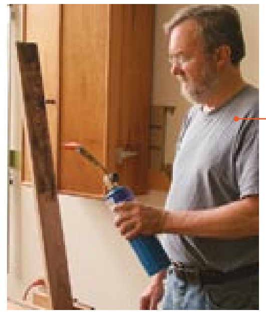
Watch David Finck ("Wood Planes Made Easy") set the blade in a Krenov-style handplane. Plus: An exclusive video interview with the master cabinetmaker and plane-maker, James Krenov.



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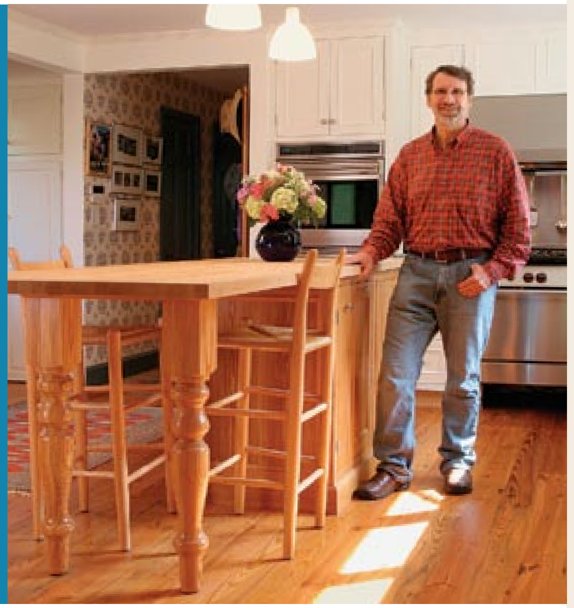

When a woodworker gets as famous as **Norm Abram** (*"My Dream Kitchen"*), people always want to know whether he does the work himself or has a bevy of assistants waiting in the wings. But this TV veteran has been perfecting his woodworking skills since he was a boy, when he made wooden toys for his sister. He uses an assistant only for cleanup and finishes. As host of *The New Yankee Workshop*, Abram has perfected the craft of inspiring others to take up woodworking as a hobby. Working in a 936-sq.-ft. workshop, he completes a typical show in two days, though the preparation can take weeks.

James Condino (*Finish Line*) has 158 handcrafted musical instruments under his belt. Since 1979, when he started working as a luthier, he's built mandolins, guitars, double basses, and other instruments using fine tools, air-dried timbers, and hide glues. He recently moved from Portland, Ore., to Asheville, N.C., where he runs the Cascade School of Lutherie (www.condino.com). He's also working on a book about building the modern mandolin.

Twenty-five years after rowing for his college 1st VIII at Oxford University, managing editor **Mark Schofield** (*"One Editor's Favorite Finish"*) was lured back to the water by his wife. Now a member of a rowing club located, ironically, in Oxford, Conn., he sculls a single on the Housatonic River. While the location may have changed, he still objects strongly to rowing before 7 a.m.

Stuart Lipp (*"5 Smart Repairs for Veneering Mistakes"*) works at Steinway & Sons in New York City, where these days he officially spends more time at a desk than a workbench. He gets his revenge on the weekends, though, when he and his wife, Nadia, head to Cape Cod. There, the ultimate project awaits: returning his grandfather's 1985 Marshall 22-ft. catboat to seaworthiness.

When he's not building tree houses or performing music with his daughters Ledah and Willa, **David Finck** (*"Wood Planes Made Easy"*) designs and builds furniture and lighting, makes acoustic guitars, teaches, writes, and produces plane irons. Finck learned woodworking from his father, Henry Finck, and studied with James Krenov in the mid-'80s. He has maintained a studio for 21 years, the past 10 in the mountains of North Carolina.

For more information on our contributors, go to FineWoodworking.com/authors.

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letters

Spotlight

ISSUE NO. 194
November/December 2007
p. 36

CLAMPING PRESSURE: REALITY CHECK

I read with interest Roman Rabiej's article about proper clamping, and, out of curiosity, applied his formula to some laminated maple legs I recently made for a table. According to the article, I would have needed 114 I-beam-type clamps to laminate the pieces for each 4-in.-thick by 4-in.-wide by 32-in.-long leg. Good thing I had done the glue-ups before I read the article; I would have had to buy a whole bunch more clamps. In fact, the glue-up would have been impossible: There wouldn't have been room to get all of the required clamps on the leg!

—JIM BRANCH, Deltona, Fla.

Editor replies: This article created some concern and confusion among readers. In retrospect, the pressure we recommended for various woods was closer to optimum than minimum, and we should have done a better job explaining that. The overall point is: The higher the clamp pressure, the thinner the glueline; and the thinner the glueline, the stronger the joint. So most woodworkers are probably underclamping their joints.

That said, if you are clamping large areas, such as stock for the legs of a workbench, don't worry if you don't have sufficient clamps or if there isn't enough room to use them all to reach the recommended pounds per square inch (psi). Just apply as much pressure as you can.

The reality is that not every joint requires an optimal glueline, one that is stronger than the wood itself. Veneer comes to mind, as does any joint with built-in mechanical strength, such as dovetails and mortise-and-tenons, where it is impossible to apply very high pressure anyway.

Other readers worried about high pressure "starving" a joint. As Rabiej explained, the true optimum clamping pressures were twice those that he recommended in the chart on p. 38. In other words, the gluelines were at their strongest at extreme pressures, well beyond the reach of normal woodworking clamps. "Starving a joint," then, is a myth, at least when it comes to hand-operated clamps. Of course, it is possible to apply too little glue in the first place, or apply it unevenly.

Quick Grips stronger than parallel jaws?

In the recent clamping article (*FWW* #194), there is a list of common clamps with the average force each one will apply, based on a test involving four *FWW* editors. I find it hard to believe the numbers for parallel-jaw clamps (370 lb.) and Quick-Grip clamps (470 lb.). I have used both types of clamps for many years, and I can only surmise the numbers and positions were reversed.

—ALAN SCHAFFTER, Washington, N.C.

Editor replies: We, too, were surprised by the power of these larger Quick-Grip clamps, but we tested them several times and have no doubt about our numbers. It seemed harder to exert high pressure using the round grip on the parallel-jaw clamps, compared to the more positive grips on the others.

If you want to make a simple clamp-pressure jig like the one mentioned in the article, you can see plans at www.finewoodworking.com/letters.

Earlex spray system got a bad rap?

The author of "Spray-Gun Choices" (*FWW* #194) wrote that the Earlex HV5000 (a turbine-based HVLP system) can't produce enough air pressure to spray water-based finishes successfully. We strongly disagree with his findings as we have tested various brands of water-based finish with great success.

These finishes have a low-medium viscosity and do not need significant pressure to get a great spray pattern; however, they do require a certain fluid tip and needle to ensure a fine finish. I understand the test was conducted with a 2.0-mm tip and needle, which wouldn't atomize the finish satisfactorily. However, if you used a 1.5-mm or 1.0-mm fluid tip and needle, then the result would have been a high-quality finish.

—IAN MULLANEY, CEO, Earlex Inc.

Editor replies: When we contacted Earlex to supply the author with a spray gun for this overview of equipment, we specified that it would be used for water-based finishes. Unfortunately, the gun was supplied with the standard 2.0-mm tip and needle, which we assumed was correct for the task. To do justice to your system, though, we'll try it out with the narrower tip. If it works well, we'll be sure to tell readers about it in an upcoming issue.

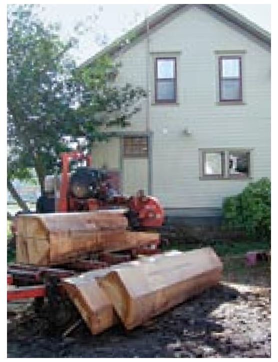
We focused our testing on water-based finishes because they don't require an industrial spray booth, making them the easiest and safest option for hobbyists. Also, water-based finishes are an excellent test for spray systems. They are tougher to atomize than solvent-based finishes, so any system that can handle the former can handle the latter.

Inspired by Gibson's kitchen

Attached is a photo of the kitchen cabinets I built based on Scott Gibson's article ("A Woodworker's Kitchen," *FWW* #185). My wife and I have been restoring an 80-year-old cabin in the northern Cascade Mountains in Oregon.

When we bought the property four years ago, the realtor expected us to bulldoze the cabin. However, working two Saturdays a month, we have slowly rebuilt it. Most of the materials we used are recycled, and the kitchen cabinets are no different. The white oak for the cabinets came from a tree removed from a nearby empty lot. The builder agreed to save me two 10-ft. lengths of the trunk, and I hired a sawyer with a bandsaw mill to turn the logs into beautiful quartersawn boards. The maple for the drawer interiors came from a basketball court removed from a church.

—TOM TAYLOR, Redmond, Wash.



Woodworker's kitchen. *Tom Taylor used white-oak logs salvaged from a nearby lot to build his new kitchen cabinets.*

Correction

In "A Modern Bench" (*FWW* #194), we mislabeled the location of a mortise. The drawing for the "inside front and rear faces" (of the legs) shows two double-mortises. In the upper pair, the right-hand mortise is located 3⁄16 in. from the edge of the leg.

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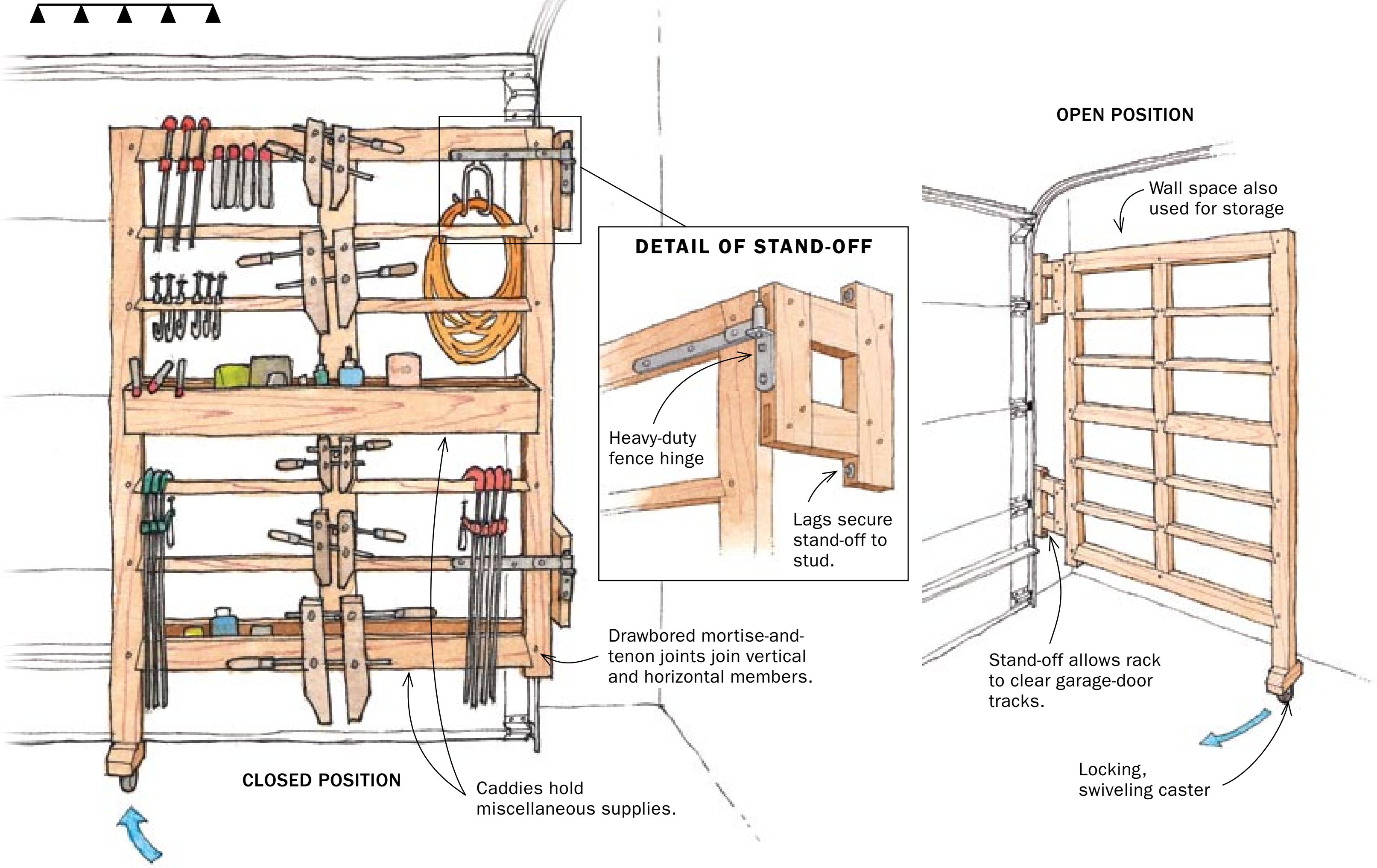


Best Tip Swinging rack adds wall space to garage

Bill Pratt is an amateur woodworker whose interests run from "country woodworking" to timber framing. Formerly a blacksmith who made tools and hardware, Pratt now works for a nonprofit organization.

The double-car garage door severely limits wall space in my garage/woodworking shop. So I created a 4-ft. by 5-ft. swinging tool rack for hanging hand tools, clamps, and accessories. Mounted in the corner of the front of my garage, it can stay against the garage door until I have to get in or out that way. The rack does not interfere with storage on the adjoining wall.

I made the rack out of 2x4 and 2x2 lumber. Two heavy-duty fence hinges are bolted to two 10-in.-wide stand-offs to hold the rack away from the wall. The stand-offs, which can be any length, are lag-screwed into a stud in the garage wall. The outside vertical member of the rack is a leg that ends in a locking, swiveling caster, which provides needed stability.

I could have built the rack out of ¾-in.-thick plywood but decided to use it as an exercise in making haunched and pegged mortise-and-tenon joints. The joints are quite strong, without a nail or screw in sight.

I also built two 4-ft.-long caddies, one for each side of the rack. I used ¾-in.-thick pine for the sides and ¼-in.-thick Masonite for the bottom. One caddy holds gluing supplies, and the other holds my palm sander and other small sanders. To maximize storage space, I guess a guy could build a rack for each side of the garage, but that is for another time.

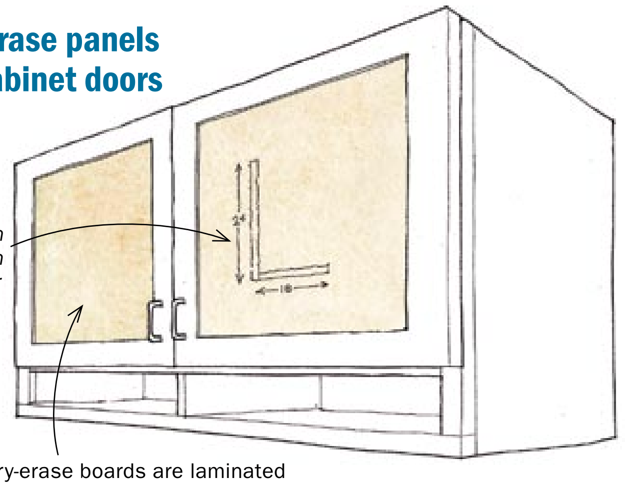
—BILL PRATT, Helena, Mont.

A Reward for the Best Tip

Send original tips to Methods of Work, *Fine Woodworking*, PO Box 5506, Newtown, CT 06470, or email fwmow@taunton.com. If published, we pay $50 for an unillustrated tip; $100 for an illustrated one. The author of the best tip gets a Leigh 18-in. Superjig, with the vacuum/router-support accessory.

Photo (left): Judith M. Johnston

Dry-erase panels for cabinet doors



When I built new cabinets for my workshop, I used white dry-erase boards for the panels in the cabinet doors. Now I can jot down notes and measurements right on the doors. And if I need to see the notes from the other side of the shop, I just open a door so it points in the proper direction.

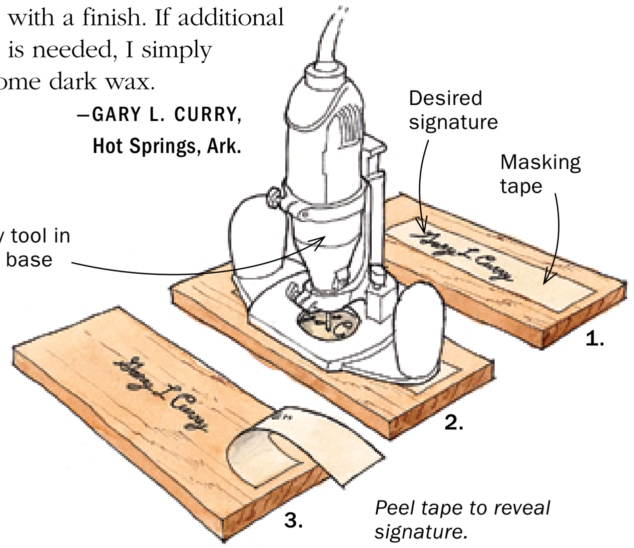
The dry-erase panels have a slick, white surface applied to a ⅛-in.-thick Masonite backing. To make the door panels, I added a piece of ¼-in. plywood to the back of the dry-erase board so the inside of the door looks decent. I purchased the dry-erase panels from www.dryerase.com, a mail-order supplier that stocks several sizes.

—DAVE ZADROZNY, Morris Township, N.J.

Put your signature on your work

Here's a method I developed to sign and date my woodworking. Place a wide strip of masking tape on the area to be signed and write on it with a felt-tip pen. Then, with a rotary tool mounted in a router base, use the tool to trace the writing. Remove the masking tape, and sand to remove any rough edges made by the bit. Seal with a finish. If additional contrast is needed, I simply apply some dark wax.

—GARY L. CURRY, Hot Springs, Ark.



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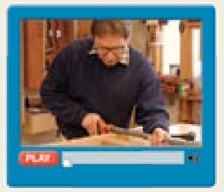

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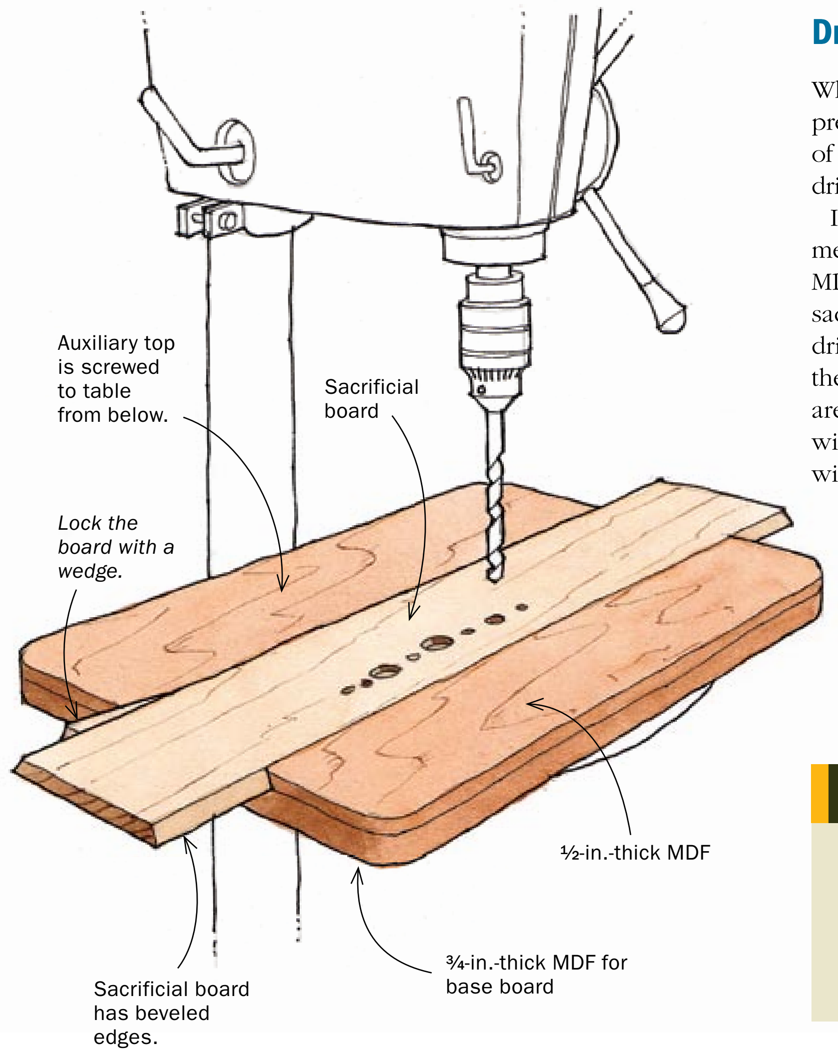
Drill-press table with a sacrificial insert



When drilling through wood, it always helps to have a backup to prevent tearout. After spending years balancing work on pieces of scrapwood, I decided to make an auxiliary tabletop for my drill press.

I made the top by gluing two pieces of beveled ½-in.-thick medium-density fiberboard (MDF) onto a base of ¾-in.-thick MDF, creating a dovetailed channel into which a beveled sacrificial board can slide. I offset the slot with respect to the drill chuck (instead of centering it) so that when one strip of the sliding board is used up I can reverse it and have a fresh area to drill into. The sacrificial board locks into the channel with a wedge. I fasten the auxiliary table to the drill-press table with screws from underneath.

Besides solving the problem of backing up holes, the auxiliary table is larger than the table that came with the drill press. This helps when drilling bigger pieces. The overhang also makes it easier to clamp fences and jigs, or the work itself, without fighting the ribs and unevenness of the cast table. It has been a great addition to my shop.

—DEAN MALMSTROM, Cedar Hills, Utah

Quick Tip

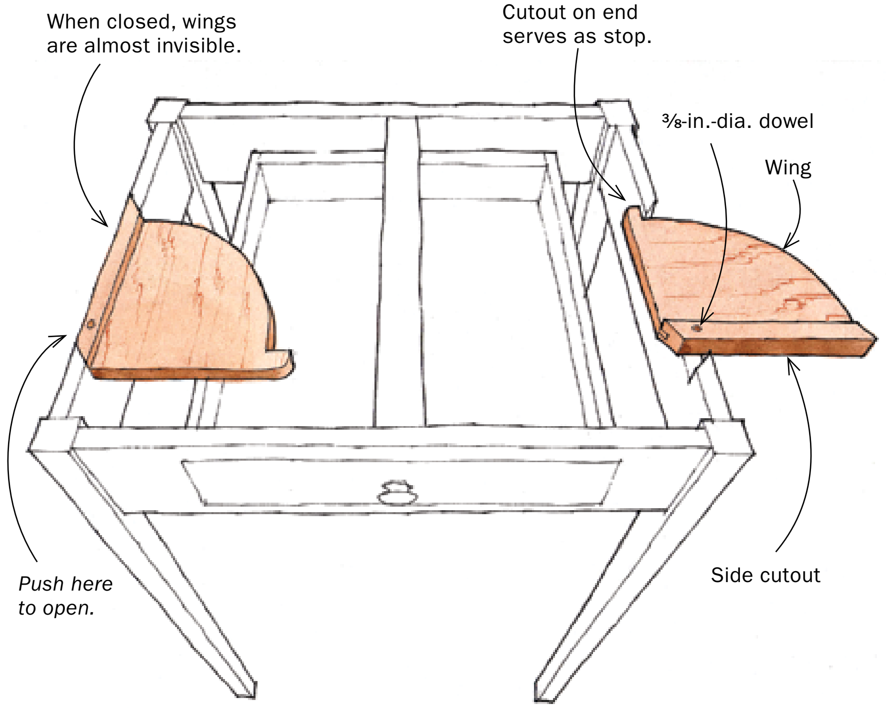
When you don't want wood glue to run, put the bottle in a refrigerator for a couple of hours before using it. Cold glue moves slowly, so it runs less. This trick also extends the working time of the glue.

—DANIEL PARROTTA, Murrells Inlet, S.C.

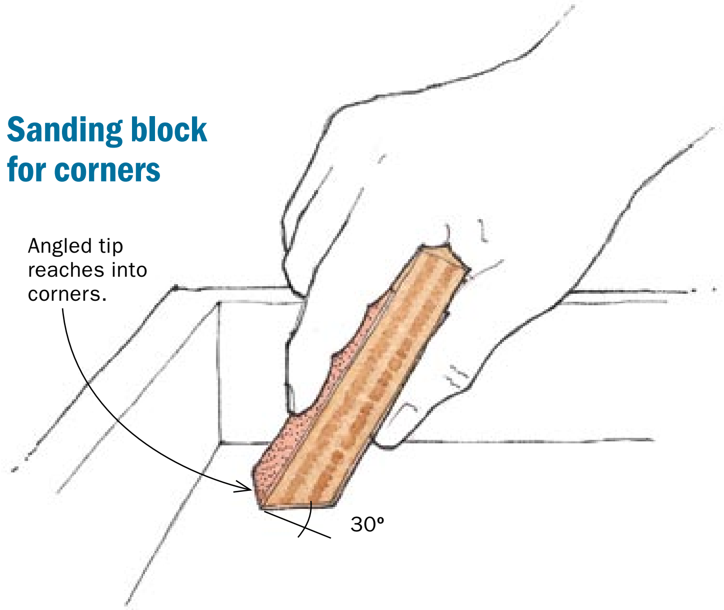
Mini-wings for end tables

After my wife clutters, er, I mean, places lots of nice, decorative objects on top of my end table, there is no place left for my drink. That's what motivated me to add a pair of pullout wings. The wings are just hardwood quarter-circles that open from the side of the table when needed. Each wing consists of two parts: the side cutout and the wing itself. The wing mounts to the side cutout, which pivots on a ⅜-in.-dia. dowel. Use care when locating and drilling the dowel hole for the side cutout in the apron. The wing should open smoothly. To open, push the doweled end with your finger, then pull the other end of the wing until it's fully open. When closed, the gaps should be nearly invisible. I recommend making a mock-up that you can use as a pattern. Remember to leave extra room above the top of the drawer for the wings.

—SKIP WHITE, Raleigh, N.C.



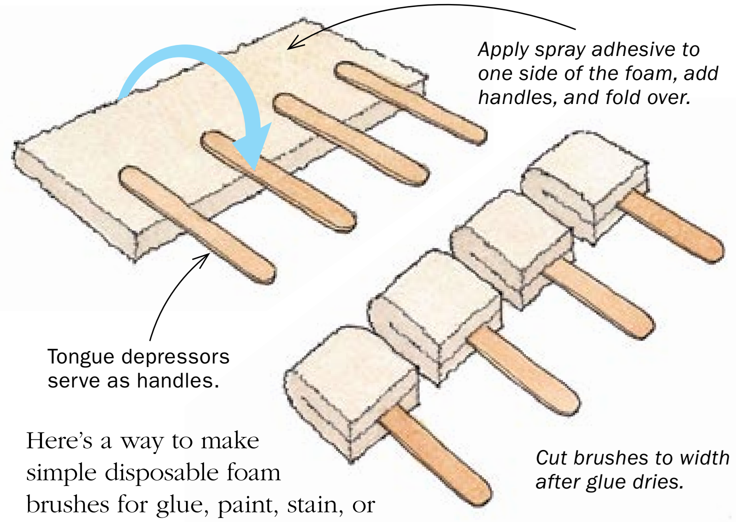
Sanding block for corners



I made this special sanding block to make it easier to clean up inside corners of a box or drawer. The shape was inspired by the profile of a chisel. I started with a scrap of ¾-in.-thick plywood about 1¼ in. wide and 4 in. long. Then I cut a 30° bevel across one end of the plywood to make a pointed end. To use, I cut a strip of sandpaper the same width as the block and wrap it around the block lengthwise. The angle of the block also lets me grip securely on both sides.

—STEVE RESKI, Austin, Texas

Shopmade disposable foam brushes



Here's a way to make simple disposable foam brushes for glue, paint, stain, or epoxy. Slice strips of foam, then cover one side of the foam with spray adhesive—Elmer's Craft Bond works well. Press tongue depressors or other sticks onto one side of the foam at appropriate intervals. Now fold the foam over the sticks evenly, press, and cut the segments apart. I make dozens of different sizes at a time. Upholstery shops have foam scraps of all thicknesses, and it doesn't take much to make a bunch of brushes—a few feet of ⅜-in.-thick material goes a long way.

—JOHN KINDSETH, Lodi, Calif.

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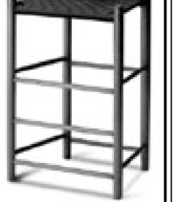

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Control your aggression. *A flip of the switch lets you change from an aggressive sanding mode for heavy stock removal to random-orbit mode for fine sanding and polishing.*

POWER TOOLS

Festool sander gets everything right

A NEW 6-IN. SANDER FROM FESTOOL, model RO 150 FEQ, has unique features that woodworkers will appreciate. The one I liked most was its sanding range. When I wanted to remove a lot of stock from a large surface, the 750-watt motor (almost 1 hp) could make the tool sand exceptionally aggressively. When I wanted to lightly sand a relatively small or narrow part, like a 2-in.-wide rails and stiles, the tool could do that, too.

The highly aggressive sanding action comes courtesy of a combination eccentric and rotational motion that Festool calls Rotex. But Rotex isn't the only option. Simply flip a switch on the tool and you instantly convert to a less aggressive random-orbit motion, a better choice for finer sanding.

The gearbox is fully enclosed to protect it from dust. Festool claims this helps increase the life of the tool.

Because the sander is designed to be used with a shop vacuum, it does not include a dust bag. When hooked up to a shop vacuum, the sander did an excellent job of collecting dust. Indeed, it left no noticeable dust on the workpiece or in the air. Without the vacuum, it created a dust storm, especially when in Rotex mode. Festool has fitting options for various shop vacuums.

Another good feature is an edge protector that can be added or removed quickly. In place, it prevents the edge of the sanding disk from contacting (and possibly scratching) an adjacent surface.

A rubber collar on the outside of the sanding pad acts like a brake when the sander is turned off. It reduces wind-down time to 3 or 4 seconds, so you can put it down almost immediately.

The Festool RO 150 FEQ is a great sander with many well-thought-out features. But at $440, the quality and innovation don't come cheap. For more information, go to www.festoolusa.com or call 888-337-8600.

—Tom Begnal is an associate editor.

MEASURING

ANGLEWRIGHT MAKES DEPTH SETTING EASIER

A NEW MEASURING TOOL from 21st Century Scientific, the AngleWright Height Gauge, makes it easier to set cutting depths on tablesaw blades and router bits. A ½-in.-wide pointer allows you to quickly place the tool on the bit or blade. A scale mounted to the side of the tool is readable to 1⁄32 in. Fine adjustments are an easy matter, thanks to a microadjustment knob.

This is a precision tool, made from anodized aluminum, steel, and brass. All the parts are machined, and they slide smoothly and adjust accurately.

The AngleWright Height Gauge sells for $135. At that price, I'll live with my combination square. But if you can afford it, this is a great little tool that will get regular use in the shop. For more information, go to www.anglewright.com.

—T.B.

Photos, except where noted: Staff

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■ BLADES & BITS

New dado sets from Bosch and CMT

MODEL/SOURCE	STREET PRICE	BOTTOM OF CUT		EDGES	
		SCORING AT CORNERS	OVERALL FLATNESS	PLYWOOD	MELAMINE
Bosch 24-tooth set www.boschtools.com	$180	No	Fair	Good, some tearout	Excellent, no tearout
Bosch 40-tooth set www.boschtools.com	$230	No	Good	Very good, very slight tearout	Excellent, no tearout
CMT 12-tooth set www.cmtusa.com	$110	No	Very good	Fair, some tearout*	Fair, some tearout*

*rated excellent at slower feed rate

THREE NEW 8-IN.-DIA. dado-blade sets recently came on the market. Bosch introduced two, one with 24 teeth and one with 40 teeth. CMT introduced a 12-tooth set. All can cut dadoes up to 13⁄16 in. wide. I gave each one a cutting test in my shop.

Testing procedure—As a basis for comparison to other dado blades, I followed the procedure used by Steve Latta when he evaluated 15 dado sets in *FWW* #176. I tested each blade by cutting melamine and veneer plywood. The plywood was cut across the grain of the face veneer.

I made up samples of each material, ¾ in. thick by 12 in. wide by 16 in. long. I then set up the dado set to cut a ¾-in.-wide by ¼-in.-deep dado with each pass, making 22 passes on each sample of material for a total of 44 cuts with each blade.

I evaluated each cut for tearout on the face of the material and whether the bottom of the cut was flat and smooth, including scoring at the corners.

Compared to the Bosch sets, the CMT required a bit more force for a given dado width, and slower speed across the blade for a tearout-free cut, no doubt due to the fewer number of teeth. But the bottoms of the dadoes and rabbets were very flat.

Which would I buy? Considering that the CMT costs much less, created flatter bottoms, and produced no more tearout at a slow feed rate than the Bosch sets, the CMT would be my first choice.

—Fred Sotcher is a woodworker in San Jose, Calif.

Online Extra

To post ratings and reviews of the tools you own and to browse our free archive of tool reviews from the last five years of ***Fine Woodworking*** magazine, go to **FineWoodworking.com/ToolGuide.**

■ INDUSTRY NEWS

RASP MAKER AURIOU CLOSES DOORS

THE 150-YEAR-OLD FRENCH TOOLMAKER AURIOU, best known to American woodworkers for high-quality, hand-cut rasps and rifflers, ceased operations in early October. In a written statement from the company, owner Michel Auriou blamed labor issues for the closing.

However, the statement suggests that Auriou might not yet be done with rasp making: "…it is Michel's fervent hope that sometime in the future he may be able to find a way to teach these secrets again and bring his … rasps back to market."

—T.B.

■ MACHINES

A CNC machine for the home shop

Automatic carving. *The CompuCarve can create a relief carving in minutes. While suitable for many applications, the carvings fall well short of high-end furniture quality.*

COMPUCARVE IS THE INVENTION of two former robotics engineers at NASA. Stock is fed through the machine automatically as a router bit mounted on a flex-shaft works back and forth to carve the workpiece.

At $1,800, the CompuCarve costs much less than other automated routing machines. Similar in size and design to a benchtop planer, the CompuCarve can handle stock up to 5 in. thick and 14½ in. wide. Using a variety of easily changed plunge-cut router bits, the machine allows you to crosscut, edge-rout, bevel, joint, and miter using a numerical keypad on the side of the machine. In my shop, most of these operations are performed more easily elsewhere.

What piqued my interest was this machine's carving capabilities. Designs can be created on the CarveWright software included with the machine. It's a simplified drawing program—easier than most CAD programs, but sharing many of the same functions. The drawings are then uploaded from the computer to the CompuCarve machine and settings are controlled from a simple keypad on the side.

For more information, go to www.craftsman.com.

—Matthew Teague builds furniture and writes about woodworking in Nashville, Tenn.

■ JIGS

CUT DOVETAILS IN STOCK OF ANY WIDTH

PRAZI USA RECENTLY RELEASED the Chestmate dovetail jig. The benefit of this jig is its versatility—the number and size of the tails is variable and there is no limit to the stock width.

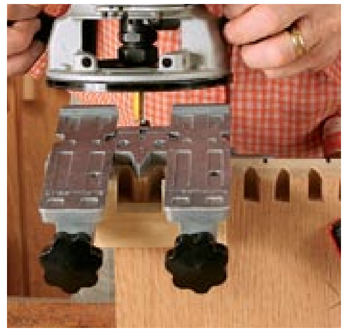
For each project, you first need to create a unique index board, really just a length of scrapwood equal to the width of the stock being dovetailed. You cut shallow kerfs in this board to register the side-to-side placement of the jig and thus the number and placement of the tails.

My main issue with the jig was that, at each end of the stock, it created half-tails rather than the more traditional and aesthetically pleasing half-pins. That said, half-pins are doable if you alter the normal setup and add extra support at each end of the stock. Another option is to start with extrawide stock and, after the joint is cut, trim the edges to make the half-pins.

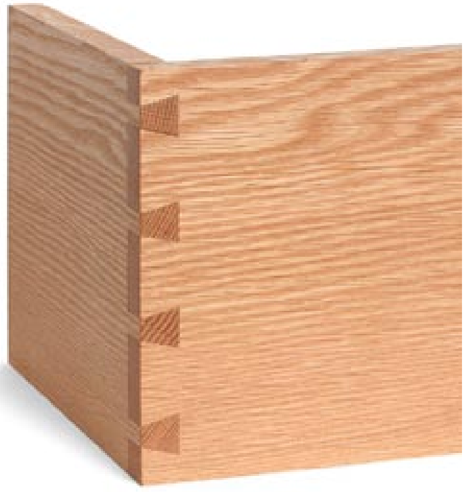
The Chestmate handles stock from ½ in. to 1 in. thick. The standard model cuts 14° through-dovetails, but a new 7° template is available as an accessory.

The user must supply a guide bushing and router bits, which are all standard sizes and readily available. The Chestmate retails for about $100 from many woodworking retailers or online at www.praziusa.com.

—Tim Albers reviewed dovetail jigs in *FWW* #187.



Cut tails first, then pins. *With a tail-cutting insert in the jig, cut the tails with a router equipped with a guide bushing and a dovetail bit. To cut pins, add a pin-cutting insert and replace the dovetail bit with a 5⁄16-in. straight bit.*



Photos, this page (left two): Matthew Teague

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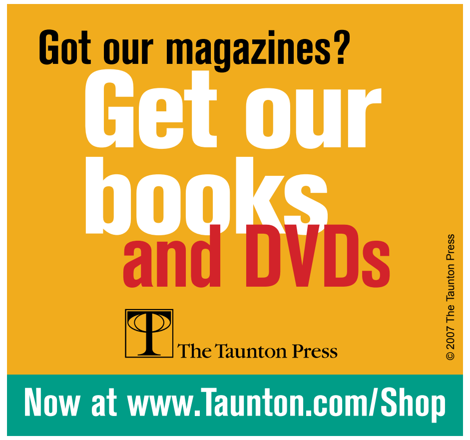

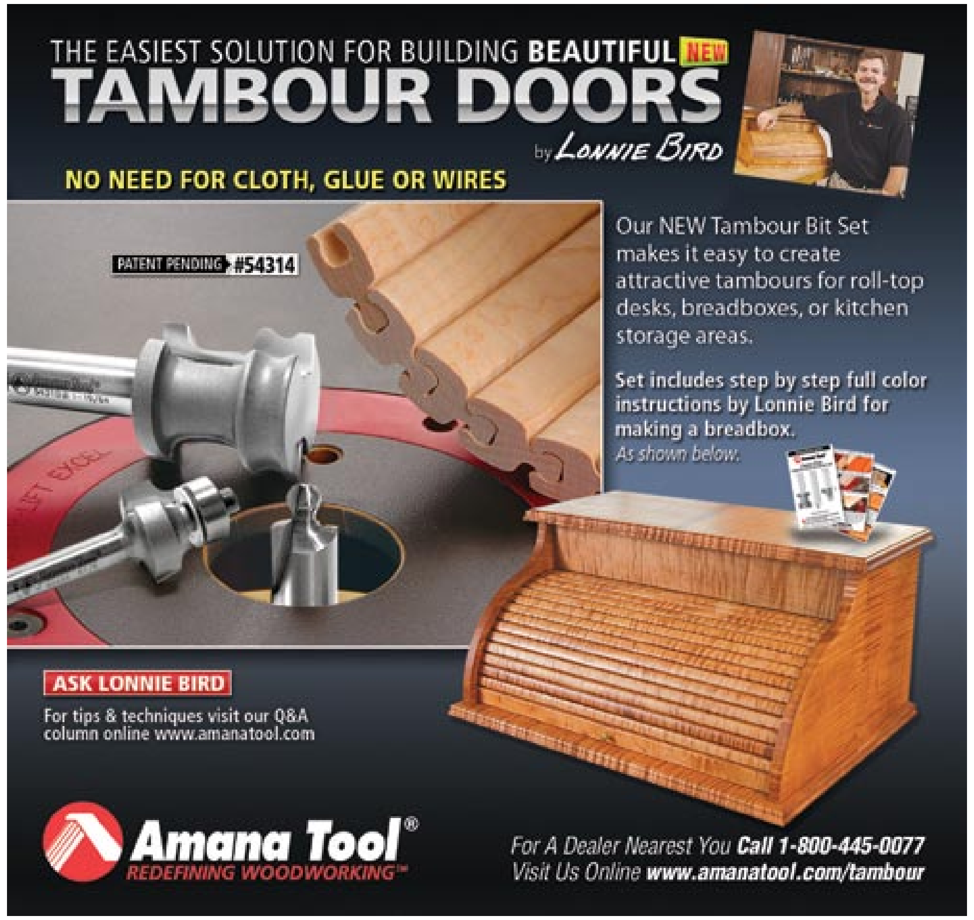

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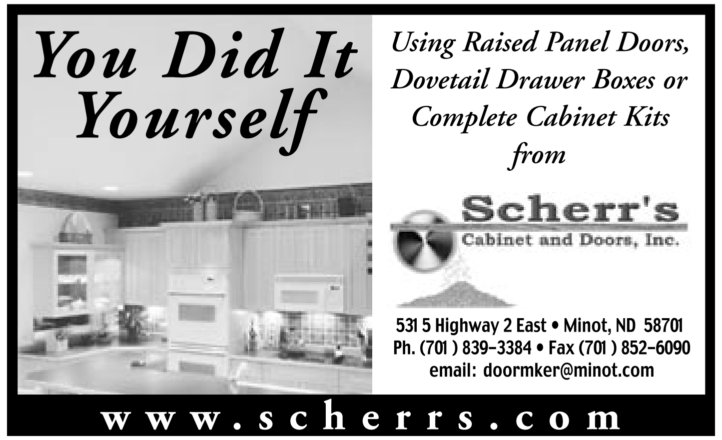

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fundamentals

The 5-minute dovetail

JOINERY PRACTICE IS A WOODWORKER'S WARM-UP

BY GARY ROGOWSKI

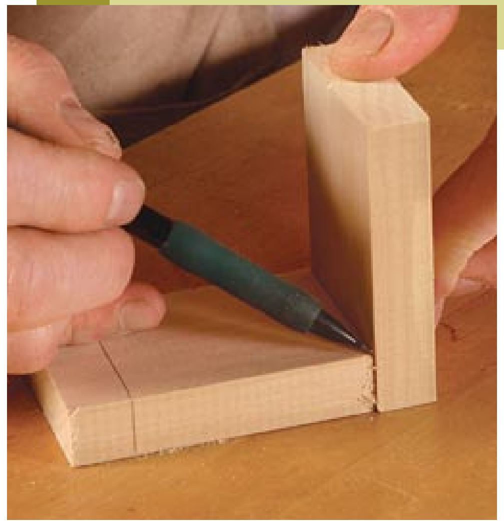
What is it about woodworkers?

Baseball players loosen up their arms and take batting practice before a game. Violinists rosin their bows and tune their instruments before a concert. Artists draw big circles on their pads before drawing a portrait. Everyone seems to warm up before starting work except woodworkers.

What hubris tricks us into believing that we can begin sawing *right now* on that fiddleback maple, without getting ready? Some of us, hell-bent on "getting something done tonight," only make

Dovetails by the boxful. *Rogowski keeps several hours' worth of five-minute dovetails on hand to show students that the results don't have to be pretty.*

1. Lay out and cut the tail



The only layout tool is a pencil. *Start by marking the thickness of each piece on the end of its mate (above). Set the angle by eye and cut to the line (above right). Concentrate on keeping the line of sawteeth perpendicular to the board's face. Turn the workpiece in the vise and crosscut along your layout line to remove the waste (right).*

Clean up, but don't fuss. *Use a ½-in. paring chisel to square up the sawcuts.*

Photos: Steve Scott

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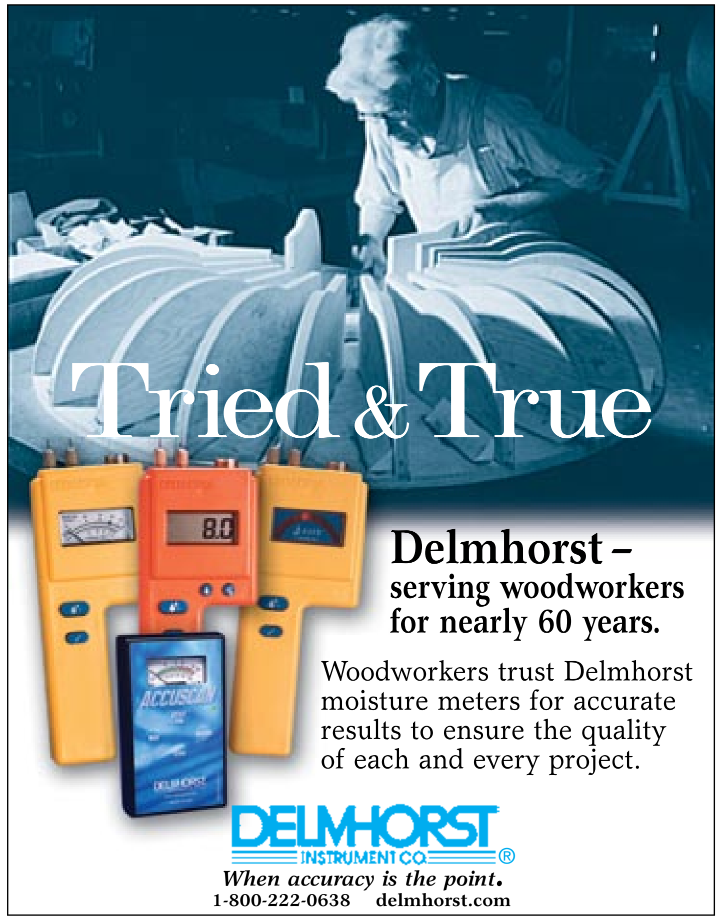

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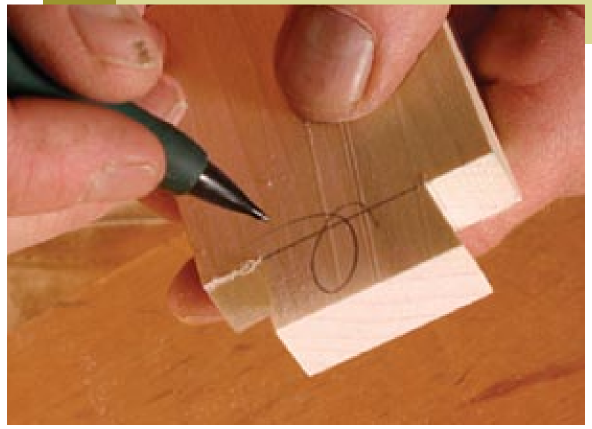
2. Lay out and cut the half-pins



Mark the outside face. *This helps ensure that you assemble the finished joint in the same orientation that you laid it out.*

Transfer the tail outline. *Hold the pieces together tightly while making layout marks for the dovetail half-pins that will straddle the large tail.*

This cut is straight up and down. *The saw is angled front to back this time.*

Hog out the waste. *Use a coping saw to remove the bulk of material between the two half-pins.*

more work for ourselves in fixing mistakes. I do not have an answer. But I do have a strategy, at least for myself and for my students. It's called the five-minute dovetail.

This simple exercise consists of hand-cutting a single large dovetail to join a couple of pieces of scrap. It helps me practice hand skills while easing me into the focused mindset required for woodworking. For beginners, it's also a great introduction to hand-cutting a dovetail joint. The results don't have to be perfect. The point is to practice and get familiar with your body, the tools, and your bench.

The exercise uses wood like poplar or alder milled to about ⅝ in. thick by 2 in. wide by 3 in. long. You'll need a pencil, a backsaw, a coping saw, two chisels (¾ in. and ½ in.), a mallet, and a bench hook. Your tools should be sharp, your saws waxed for lubrication. Start by marking out the thickness of the stock on all four sides. There's no need for a marking gauge; just hold one board tight to the other and pencil in the line.

Guiding a saw

The next step is all about controlling a backsaw. Work on your stance (arm and shoulder behind the cut) and your grip (firm enough to propel the saw, but not white-knuckled). Put one piece in the vise, end grain up, and start the tail cut. Drawing the saw across the thickness of the workpiece, make a slight kerf perpendicular to the two faces. Now tilt the blade sideways so the cut angles down toward the center of the board at 7° to 10°. Saw down to the marked line. Cut the other side at an equal angle. It doesn't matter if they don't match! After sawing, rotate the piece in the vise and crosscut the shoulders down to the first saw lines. Clean up these cuts with a chisel.

Transferring the layout

Now it's time to work on transferring a layout accurately and sawing to a line. First, mark the outside face of each piece. Then hold the completed tail board against the pin board at a right angle and mark the tail shape onto the end grain of the mating piece. Make the pin cuts holding the saw straight up and down

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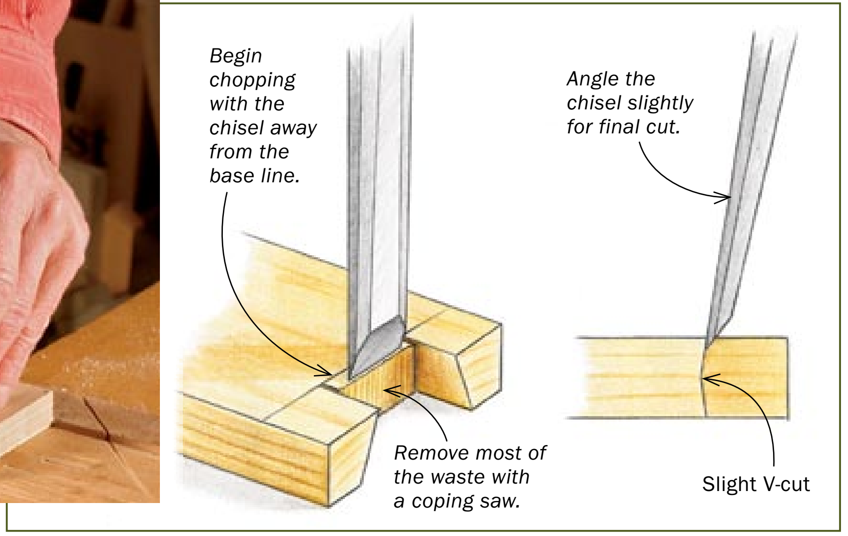
3. Clean up and fit the joint

Chop out the remaining material. *Support the workpiece against a simple stop and use a mallet and ¾-in. chisel to finish removing the waste.*



and at the angle you have marked. Saw just on the waste side of the line down to the baseline. Now use a coping saw to make a pair of cuts, sawing away the waste as close to the line as you can. Then set the pin piece on the bench, supported by a bench hook or simple stop, to chop away the waste.

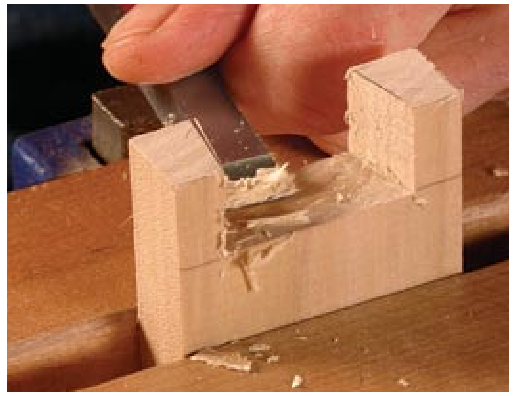
Finish with some chisel practice

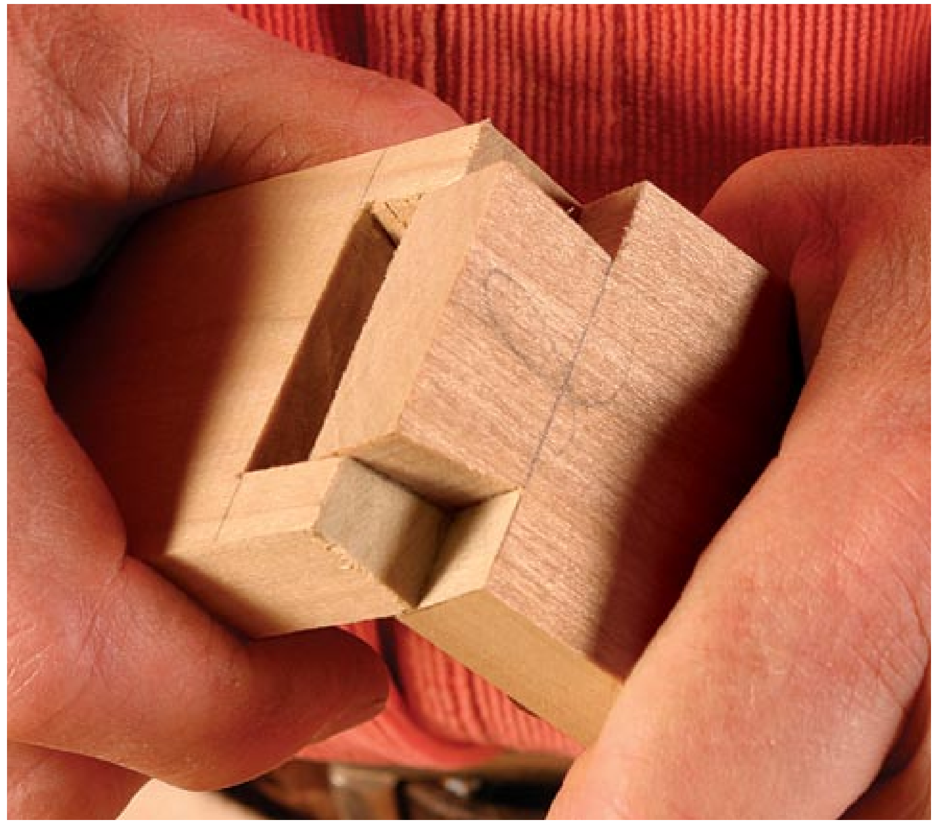
Remember, the chisel acts as a wedge. If you set it right on the line and strike it hard, it will move into the good wood. Instead, start well off the line and chop down from both faces toward the middle. Finish chopping from both faces by setting the chisel right on the line, angled inward to create a slight V-cut.

Check the fit; you may need to pare slightly across the pin's face. Just be careful to always keep your hands behind the business end of the chisel. And don't use a hammer to coax those pieces together. Too tight a fit may cause splitting.

Have fun with the dovetail exercise, learn to relax and get acclimated to the bench, and just do your best. □

Clean up the surfaces. *Use the ½-in. chisel to square the sawn and chopped surfaces.*





The moment of truth. *A good five-minute dovetail is a great way to warm up and get focused for each workshop session as well as reduce your fear of handcut joinery.*

Drawings: John Tetreault

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The Measure of Precision

READER SERVICE NO. 101

1. Painted surfaces complement wood

Cabinets that mix wood and light-colored painted surfaces make the room brighter and add a fashionable look. Painted surfaces have several advantages: Down the road when they become worn and the color fades, you can add a new coat of paint to restore or change the color. Also, the materials that are ideal for painting are also very economical. Plus, MDF offers extra stability.

My Dream Kitchen

Norm's 20 essential tips for making cabinets to suit a modern lifestyle

BY NORM ABRAM

For a couple of reasons, the upcoming 2008 season of *The New Yankee Workshop* is a special one for everyone involved. First, it's our 20th anniversary, and we're especially proud of that milestone. Second, a good part of our entire season—nine episodes—will be devoted to showing our viewers how to build a custom dream kitchen. It's a project I've wanted to do for a long time. And now that the kitchen is complete, I feel it was well worth the wait.

For more than 35 years now, I've had a hand in designing, building, and installing a good many kitchen cabinets. And during that time, I've managed to learn a lot about what works well and what doesn't.

This article is a collection of my favorite tips and techniques, organized into those three essential stages: design, construction, and installation. I hope you find them useful, and that they help you turn the kitchen you dream about into your dream kitchen.

My basic approach

I think most home woodworkers will find my method of building kitchen cabinets relatively straightforward. The plywood case is held together with glued and screwed dado and rabbet joints. Solid-wood face frames are assembled with pocket screws and joined to the case with glue and biscuits. To simplify the process, beads and moldings are applied after the fact. Drawer boxes are dovetailed using a router jig. The result is a handsome, versatile, rock-solid cabinet that is easy to build with common woodworking tools.

Why build your own kitchen?

Custom cabinets mean you're not limited to standard cabinet sizes. Granted, you'll generally want to stay with standard dimensions, but when a non-standard cabinet makes sense for the way you use a kitchen, go ahead and break the rule. One caution: Make sure your changes meet all local code requirements.

You also can customize the style when you make your own cabinets. Commercially available cabinets come in a wide range of styles from colonial to contemporary, but that doesn't mean you'll find one that's perfect for you. Style options are unlimited when you are the designer.

Consider, too, that you can use almost any wood that suits your fancy. For the island, we used southern pine reclaimed after it sat on the bottom of a river for about 100 years. The wood has a patina that's just remarkable. But you won't find it on a commercial cabinet.

Building your own kitchen cabinets has one more big plus. For about what you'd pay for a stock kitchen, you'll end up with a top-of-the-line kitchen, customized to meet the way you work and live.

Reality check—Be aware that you'll be moving around a lot of 4-ft. by 8-ft. sheets of plywood and some medium-density fiberboard (MDF), too. Both are heavy and awkward.

Also, kitchen cabinets are big, so make sure you have enough room in your shop to assemble them. Once the cabinets are assembled, you'll need a big area such as a garage to store them until installation time.

Master carpenter Norm Abram hosts The New Yankee Workshop. *The 20th season debuts January 5 on PBS stations. Check your local listings.*

Online Extra

To see these tips in action, go to **FineWoodworking.com/extras** starting Jan. 2 to watch selected clips from the PBS show.

Photo: Michael Pekovich

Design tips

If your budget allows, an architect or kitchen designer can help you put together a kitchen that looks great and lets you work comfortably and efficiently. Or, you can get inspiration from magazines, catalogs, the Internet, and even TV shows. In this case, the homeowners put together a scrapbook of kitchen ideas. Here are some we included.

2. More drawers, fewer doors

In lower cabinets, drawers make for easier access than doors, so you'll spend less time stooping. Even the microwave in this kitchen (bottom) works like a drawer—keeping out of the way, while allowing access to food from above.

3. Give the cabinets a furniture look

Most kitchen cabinets gain an extra measure of eye appeal when made to look like furniture. Inset doors (above) and drawers, common to fine furniture, elevate the style. Non-mortise-type butt hinges (center) are easy to install yet add to the furniture look. If the cabinets have an exposed end panel, it helps to add some sort of detail to it, like an applied frame and panel. Adding a pair of turned legs to our island (below) gave the piece a kitchen-table flavor, and gave us some places to sit.

4. Customize cabinets to suit your lifestyle

When you are the builder, you're not limited to using standard cabinet dimensions. Consider a deeper-than-standard sink cabinet to reduce crowding around the faucet. Allow adequate room between lower and upper cabinets for newer, taller countertop appliances (upper right). Last, extending upper cabinets to the ceiling (lower right) makes better use of space, eliminating an area that mostly collects dust and kitchen grease. Plus, it just looks neater.

5. Make a family-friendly kitchen

A pantry, once common in homes, is an idea whose time has come back. If space doesn't permit a full-size walk-in pantry, consider a pantry closet, as we did (left). It added lots of extra storage in a relatively small footprint. And, by adding short shelves on the inside of the door, we made the space even more efficient.

If you have the space, consider including a home office with a computer in the kitchen (right). It helps the cook make a meal and get some work done at the same time. And kids can get computer time while visiting with mom or dad. Even better, consider a computer with a television tuner so you can watch some TV in the kitchen.

Photos, this spread: Michael Pekovich; facing page (bottom right): ©2007 WGBH Anthony Tieuli

Construction tips

Keep two main goals in mind when building kitchen cabinets. First, you'll want them strong, so they can stand up to years of everyday use. And, second, you'll want to make them efficiently. That means a minimum of wasted time and materials. Bear in mind, some of these tips assume painted cabinets.

6. Choose the right materials

Use solid poplar for the face-frame and door-frame parts. It's durable, readily available, and takes paint very well. Make drawer fronts and door panels from MDF. It's inexpensive and it also likes paint.

For the interior case parts, use prefinished maple plywood. It's stable, strong, and eliminates the need to finish the inside of the cabinet. Plus, the finish is extremely durable.

7. Make the cases rock solid

Rabbet and dado joints, glued and screwed, are easy to do and make for a sturdy case.

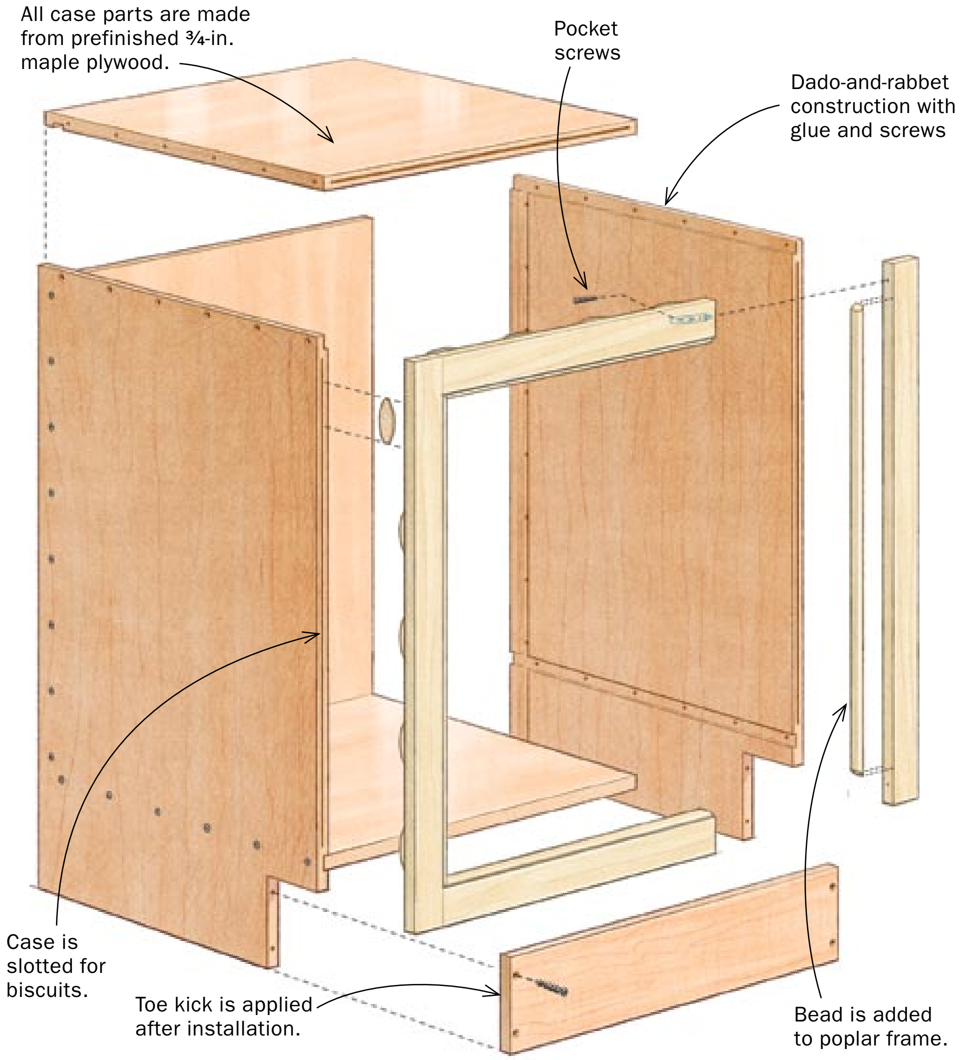
To easily locate screw holes in cabinet cases, drill the shank holes from the inside faces, through the rabbet and dado grooves; then countersink the shank holes on the opposite side. After applying glue and fitting the pieces together (but before driving wood screws), drill pilot holes to prevent the plywood from splitting.

8. Layout sticks save time and reduce errors

Use vertical and horizontal layout sticks to establish the widths, heights, and locations of the new cabinets, appliances, windows, electrical outlets, and light switches. When completed, the sticks become full-size blueprints that go with you into the shop.

9. Make cases from ¾-in.-thick plywood

Factory cabinet cases often have thin backs and partial tops. For extra strength, make the cases from ¾-in. plywood. Install the back in a groove set ⅜ in. to ½ in. from the back edge of the sides. The set-in allows room to scribe and trim the cabinet if the wall is uneven or out of plumb. The thick plywood also lets you screw through the case back into the wall.



Photos, this spread: 2007 WGBH/Morash Associates Inc.; facing page (bottom left): Michael Pekovich; drawings: John Hartman

10. Join face frames with pocket screws

Used with a jig, pocket screws make joints in no time. They offer plenty of strength, considering that the frames end up glued to the cases. Use the jig to drill the holes and then clamp the pieces flush before screwing the joint together. No glue is used.

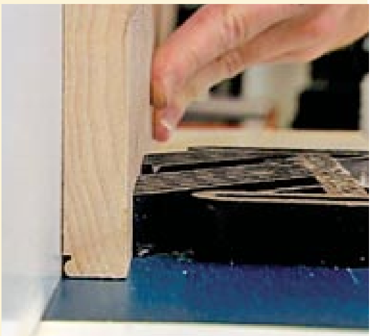
11. Attach face frames with biscuits

Biscuit joints are a quick, easy, and strong way to glue the frames to the cases. Plus, you don't want any nail holes to fill on this very prominent surface. To save time, instead of cutting individual slots in the case fronts to accept the biscuits, use a slot cutter to cut a continuous slot along each edge (left). After that, cut normal biscuit slots in the face frame (left center).

Then, simply use clamps to hold the parts together until the glue dries (bottom).

12. Dress up the face frames

A shopmade decorative "pencil" bead, applied to the face frames, adds an interesting detail with minimal effort. Use a beading bit to rout the bead on the edge of a board. Rip away the beads on the tablesaw. To attach them to a frame, miter the corners at 45°, then use glue and a pin nailer to drive ¾-in.-long pins.



Rout the bead. *Attach a beading bit to a router mounted in a router table. Then, to bury the bit, adjust the fence so that it's flush with the bearing. Make the cut on both long edges of the stock.*

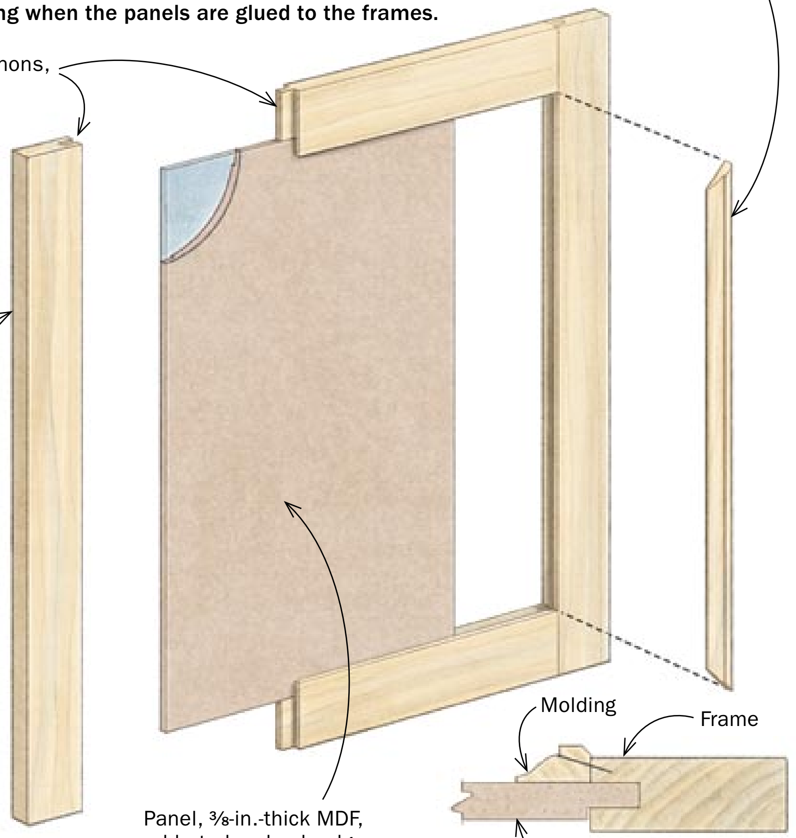
Cut off the bead. *Set the tablesaw fence to make a narrow rip cut, then cut away the bead from both edges of the stock.*

Attach the bead to the case. *Cut the beading to length so it fits inside the face frame, with each end of the beading mitered to 45°. You want the beading set back about ¹⁄₆₄ in. Attach with glue and pins.*

Construction tips (continued)

13. Use stub tenons for cabinet doors

For door frames with panels made from plywood or MDF, use stub mortises and tenons. They are quick to make and are especially strong when the panels are glued to the frames.

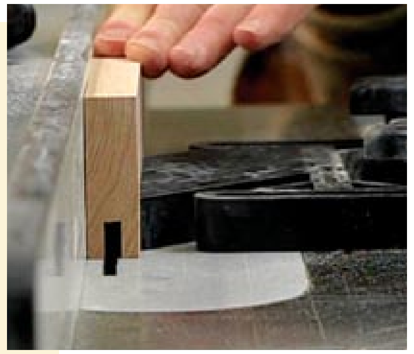


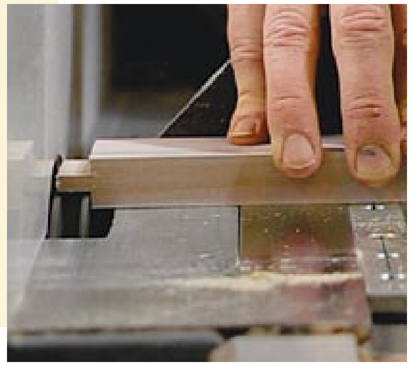
14. Apply molding to add interest

Rout the molding profile along both edges of a board, then use the tablesaw to rip the molding to width. Miter the corners to 45°, then use glue and pins to secure each piece.

15. Tablesaw speeds joinery

The tablesaw and rip fence team up to cut a groove in the stiles and rails for the rail tenons and the door panel (top). To ensure stock is centered, set the dado head to make a ¼-in.-wide cut. Make the cut, then flip the stock so the opposite face is against the fence and make a second pass. The dado cutter and miter gauge cut the tenons on each end of the rails (bottom).





16. Use the case bottom as a doorstop

Position the bottom of the case so it can double as a doorstop, with the lower face-frame rail set just below the front edge of the case bottom.

Before the cabinet is assembled, use a heat gun and roller to apply iron-on veneer to cover the exposed front edge of the case bottom. Cut the case bottom about ⅓₂ in. narrower than the top to allow for the iron-on veneer.

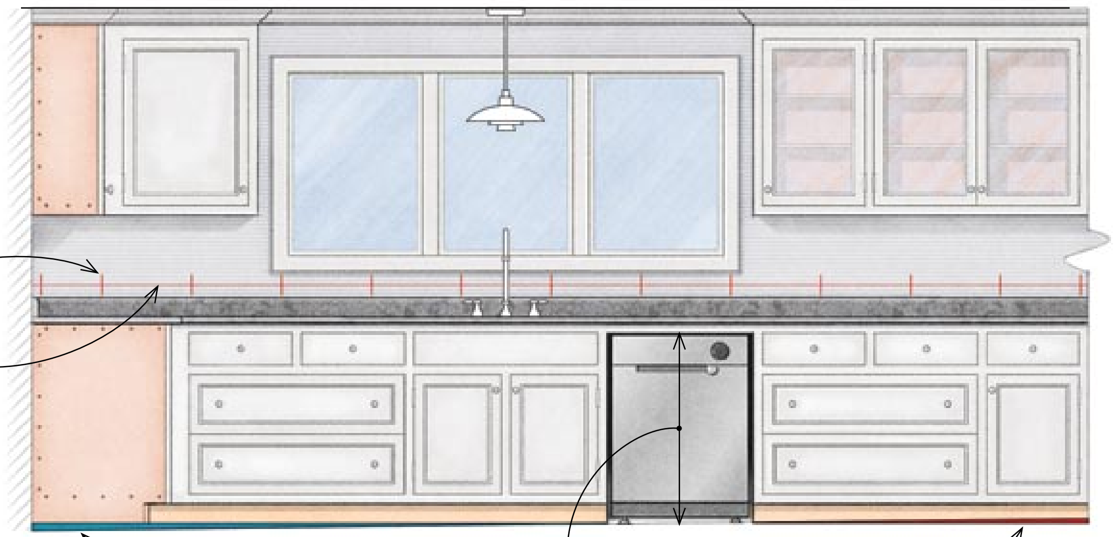
Photos: 2007 WGBH/Morash Associates Inc.; this page (second from bottom right): Michael Pekovich

Installation tips

When installing your cabinets, make sure they are securely anchored to the wall studs, especially the upper cabinets as they are often filled with heavy dishes. The end panels should have a gap-free fit against the back wall. And, of course, the cabinets must be level both end-to-end and front-to-back.

17. Reference lines are critical

Use a laser level (or a transit) to scribe a horizontal reference line on the walls. Then find the high and low points on the floor. Also mark stud locations on the wall.



18. Shim to level the base cabinets

To ensure that the tops of the cabinets (before the countertop gets added) are at the correct height for the appliances, you might need to shim the bottom of the cabinets at the low end of the wall, and trim the bottom of the cabinets at the high end of the wall.

High and low points. *Use shims to raise the cabinets at the low ends of the kitchen. You also can trim the cases, for example, scribing a front-to-back taper with a compass, then cutting to the line with a circular saw.*

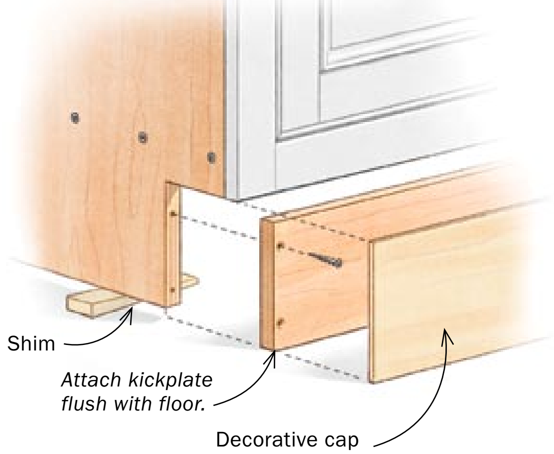
19. Scribe to eliminate gaps against walls

With the cabinet level, butt it against the back wall (and side wall when at a corner) and use a compass (below) to scribe the wall's profile along the back edge of the cabinet (or side edge of the face frame if at a corner). Using a circular saw, cut ⅟₁₆ in. outside the scribed line. Use a belt sander (bottom) to sand to the line, angling the sander to create a back-bevel for a better fit.

20. Make them all permanent

Before leveling the base cabinets, put them in place temporarily to mark stud locations so you can predrill through the backs. After leveling them, drive 3-in.-long screws through the backs into the wall studs (don't overtighten). Join adjacent cabinets with screws. Add a kickplate to the lower cabinet.

KICKPLATE DETAIL



One Editor's Foolproof Finish

BY MARK SCHOFIELD

When I joined *Fine Woodworking* in the summer of 2000, I was made responsible for the finishing articles. The editor made it seem like an honor, but in truth I don't think any of my colleagues wanted the job. Like most woodworkers, they'd rather cut wood than finish it. But today, after hundreds of hours watching finishing experts such as Peter Gedrys, Jeff Jewitt, Teri Masaschi, and Chris Minick work their magic, I have a confession to make. I like finishing.

I haven't completely bought in, however. While I'll attempt a perfect French polish, I can still relate to my fellow woodworkers who above all want a finish they can't mess up.

To meet this need, I have developed what I call the "*Fine Woodworking* foolproof finish." You first seal the wood with shellac, then apply three or more coats of gel varnish, and complete the finish with a coat of paste wax. You get a medium-luster, in-the-wood finish that can be built up to give varying degrees of protection. All three steps are applied by hand, the only "tools" are pieces of cloth, and I promise you'll be proud of the results.

Beautifies, protects, wipes on, dries quickly, enough said

It all begins with careful preparation

I've lost track of how many projects I've seen (including one or two of my own early efforts) that prominently display the telltale tracks of jointer or planer knives. Like most finishes, this one doesn't hide poor preparation; it magnifies it. So the first task is to prep the wood's surface.

If you have mastered the bench plane and/or the scraper, you can remove machine marks fairly quickly. Then use a random-orbit sander with P180-grit sandpaper followed by P220-grit paper, and finally hand-sand with the grain using P220-grit paper wrapped around a sanding block. Remove the dust with a vacuum or compressed air. If you don't handplane, start power sanding with P100-grit, move to P150-grit, and then follow the steps above.

The second step is to create a sample board on scraps from the project. After making this cabinet, designed by Garrett Hack (*FWW* #175), I could tell after wiping the bare wood with denatured alcohol that the walnut crotch used for the panels would appear darker under a finish than the walnut used for the rest of the project. I did the full finishing sequence on samples of both woods and found that a dark wax would bring the plain walnut close enough in color to the crotchwood (which gets clear wax).

Seal with shellac, then apply gel varnish

If your project includes a floating panel, it is always a good idea to finish it before inserting it into the frame. In this way you won't see a strip of unfinished wood when seasonal changes cause the panel to shrink. I also finish the inside edges of the frame

1 Shellac

Dip and squeeze. *Fold up a small piece of clean cotton cloth and dip it into a can of dewaxed shellac. Squeeze out the surplus so that it doesn't drip.*

Seal the surface. *Wipe the cloth over the surface no more than a couple of times to leave a thin film of shellac on the wood (above). Use P320-grit sandpaper wrapped around a sanding block to smooth the surface (left). Remove the dust with a vacuum or compressed air.*

Photos: Michael Pekovich

2 Gel varnish

One thick finish. *The easiest way to control how much gel varnish goes onto the cloth is to place it on with a stirring stick.*

Rub on the gel varnish, then wipe off the surplus. *Work the finish into the wood using small, circular movements, then wipe with the grain to remove any thicker deposits (left). Don't try to cover too large an area or the finish will become tacky before you can buff it. Use a clean cotton cloth to wipe away the surplus gel varnish (above), turning the cloth frequently to keep exposing a clean surface.*

components with shellac and gel varnish before assembling them. This is much easier than trying to finish the narrow strip of frame and not get finish on the panel.

I've found that giving bare wood a single coat of dewaxed shellac has a number of benefits. On blotch-prone woods like cherry or pine, shellac helps prevent the uneven shading you can get from applying gel varnish to bare wood. On dyed wood, the shellac prevents pulling away some color when you rub on the gel varnish. And finally, sealing the wood with shellac and then sanding it gives a smoother base than bare wood for the gel varnish. Use a dewaxed shellac, like Zinsser's SealCoat. It comes as a 2-lb. cut, and I apply it as is, by dipping a small piece of cloth in the can, gently squeezing out the surplus, and then wiping the wood with the cloth. A couple of strokes over each area is usually sufficient. Let the shellac dry for about 30 minutes, and then lightly hand-sand the surface with the grain using P320-grit sandpaper. Vacuum or blow the dust out of the pores.

A gel varnish (also known as gel polyurethane or gel topcoat) has much the same resin, oil, and mineral spirits as a liquid clear finish, plus a thickening agent. This makes it much easier and less messy to wipe on. And because the product is designed to be wiped, it needs no thinning. Best of all, each layer dries too quickly to attract dust, so there is no need to sand between coats.

To apply, you simply dip a cloth into the gel, work it into the wood, and remove the surplus with a clean cloth. There are a few tricks to getting the best results. First, don't apply too much gel or work on too large an area at once. The varnish gets tacky in minutes and becomes progressively harder to remove. If you find yourself trying to wipe away gel the consistency of lard, simply dampen a cloth with mineral spirits, wipe away the gel, let the surface dry, and then apply the finish again.

Start with an area of about 2 sq. ft. You can increase the area if you find you are having no trouble removing the surplus. I rub the gel well into the wood. After you first wipe off the surplus, small wood pores appear filled; but as the gel cures, it sinks down to line the inside of the pores, leaving an open-grain look.

When removing the surplus gel, keep re-folding the cloth so that you don't smear the finish. The final rubdown should be with the grain. You can let the finish cure overnight, but in reasonably warm and dry conditions you can apply two coats in a day. To avoid spontaneous combustion, always spread used finishing cloths outside to dry before throwing them away.

Sources of Supply

Woodworker's Supply
www.woodworker.com
Zinsser SealCoat, gel finishes by Bartley and General Finishes, and colored waxes by Briwax, J.E. Moser, Liberon, and Fiddes

Highland Woodworking
www.highlandwoodworking.com
Zinsser SealCoat, gel finishes by Petri and Bartley, and Sheradale brown wax

Antiquax
www.antiquax.com
Antiquax brown wax

3 Wax

Colored wax can be used to subtly change the tone of a whole piece or to harmonize sections. I used a really dark brown wax on most of the walnut but a clear wax on the panels. Allow the wax to dry for 20 to 30 minutes and then buff the surface with a clean cloth.

You should apply at least three coats to build an even luster. On a piece like a side table, where the top will get slightly heavier use, you can apply four or five coats. But don't try to build up a plastic-looking finish. In theory, you could wipe on enough coats to protect a kitchen tabletop, but liquid polyurethane would be quicker. By the way, all gel varnishes leave a satin finish.

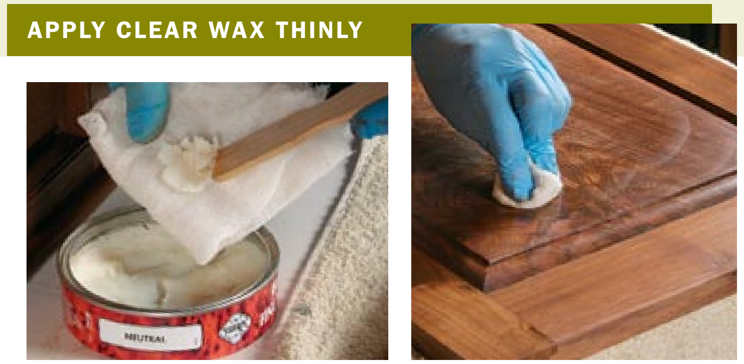
Top it off with wax

After the last coat of gel has cured for at least three days, I give the workpiece a coat of paste wax. Peter Gedrys recently described the numerous benefits of wax (*FWW* #191, pp. 54-59). Though gel varnish, applied and wiped off correctly, leaves a very smooth surface, it still has a slight grab to it when you touch it. Nothing beats the silky feel of a surface that has been waxed and buffed. Wax also gives some scratch protection, since objects are more likely to slide across the surface than to dig in and scratch it. And wax conceals any differences in sheen, though these should be minimal if you removed all the surplus gel.

Finally, dark wax left in corners and crevices emphasizes the three-dimensional aspects of the piece, and it can cover up minor blemishes in craftsmanship. You may never build the perfect piece, but at least it'll have a perfect finish. □

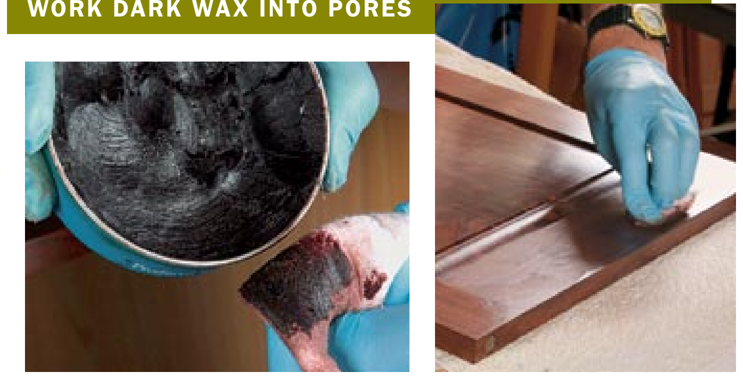
Mark Schofield is the managing editor of Fine Woodworking.

APPLY CLEAR WAX THINLY



A thin film of wax. *Fold over a piece of cheesecloth a couple of times and then place a lump of paste wax in the center (left). Gather the corners of the applicator and then press down until the wax begins to ease out through the rounded face of the applicator. To avoid having light wax show up in the pores of dark wood, use light pressure on the applicator.*

WORK DARK WAX INTO PORES



Apply dark wax directly. *If you want dark wax to enter the pores to change the tone of a piece, wipe the cloth into the wax (left). Work it into the wood and then wipe with the grain to remove the surplus (right). Buff the wax, clear or dark, until the surface is silky to the touch (below).*

The Right Edge for Your Tabletop

Go beyond router-bit profiles for custom edges that stand out

BY GARRETT HACK

I expect a lot from a tabletop edge. On one hand, I need it to be tough, able to endure a life full of bumps and bruises, even spills. Yet I want the edge to be attractive, with lines that are in keeping with the overall piece and with a profile that is pleasant to touch. It's not an easy dance to master, but it's a fun challenge.

I treat table edges with respect, spending a great deal of time on them. My goal is to design edges that are as alluring as the rest of the piece. I use the edges as a canvas to add detail or create interest by incorporating facets that catch light or add shadows. But make the edges too delicate, and they won't hold up to the ruthless wear and tear of use. I look to soften sharp, square surfaces so that they're friendly to hand and body. Subtle shapes can be very appealing, and less is usually more.

Consider the overall piece

When designing a tabletop edge, make the profile an important part of a cohesive design. Generally, simple furniture calls for simple edges while more intricate designs call for more elegant profiles. I consider the shape or aesthetic of the table and its function, the size of the overhang, the wood the top is made of, and how thick it is or how thick I would like the top to appear. You can make the top look thinner by shaping the underside of the edge with, say, an underbevel. You can accentuate thickness by using a simple bullnose or roundover, or using a beveled top edge.

The overhang of a tabletop is a critical part of a table's design. Dining tables may have wider overhangs to accommodate seating, while an overhang on a sideboard may be shorter to allow access to a door or drawer. The size of the overhang will have a direct impact on the width of the edge profile and the way it's seen. Wide overhangs can be nice, but they partially conceal the aprons or any drawers from standing view. In such a case, you may choose an

Don't overlook the overhang

The overhang is an important aspect of table design. Wide overhangs can accommodate seating and increase surface area, but they can hide aprons or drawers from standing view. Short overhangs tend to draw attention away from the top, blending it in with the overall lines of the piece.

Small table with lots of surface area. *The top of Hack's end table is wide with large overhangs. A sweeping underbevel on the front and ends makes the top look thinner, in keeping with the overall light feel of the table.*

Thick top doesn't distract. *The short overhang and wide underbevel on Hack's sideboard draw attention away from the top and toward the facade of the case.*

CHAMFERS AND BEVELS

A chamfer cut along the top or bottom of a tabletop is a simple and very effective profile that catches light, draws the eye, and softens hard edges. A bevel is simply a wide chamfer. Both can be cut with handplanes, but bevels often are cut with a router or a tablesaw and refined with a block plane.

Chamfers are quick to make with a block plane. *You can kiss an edge for a light facet or make repeated passes to create a wider flat. Use your fingertips to register the tool at a consistent angle for each pass.*

Two steps to a bevel. *Rough out the bevel on the tablesaw (above). Be sure to support the top with a tall fence as you make the cut. Clean up the sawn surfaces with a handplane (left).*

CHAMFER

UNDERBEVEL

BEVELED TOP WITH FILLET

Beyond the basic bevel

COVE

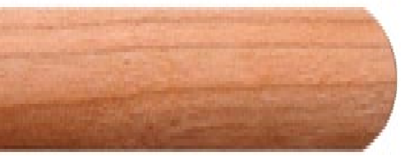
You can shape a concave profile, or cove, on a beveled edge using hand tools. First, make thick marks along the top and bottom edges of the bevel (top). Next, use a convex spokeshave (or curved scraper) to remove material between the marks (middle). Finally, use a bullnose sanding block to fine-tune the shape and remove the reference marks (bottom).

Photo, this page (bottom right): John Sheldon

Roundovers

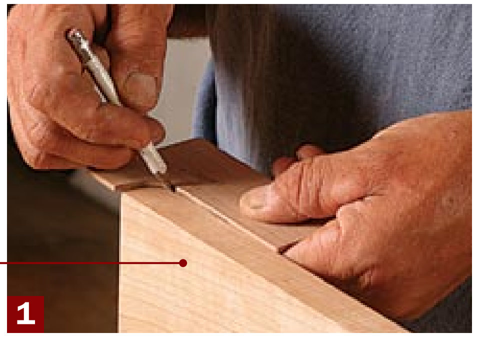
Expecting dings and bumps? Rounded edges are especially effective at deflecting them. This classic quarter-round is roughed out on a tablesaw, then refined with hand tools.

QUARTER-ROUND



BULLNOSE

BULLNOSE WITH BEVEL



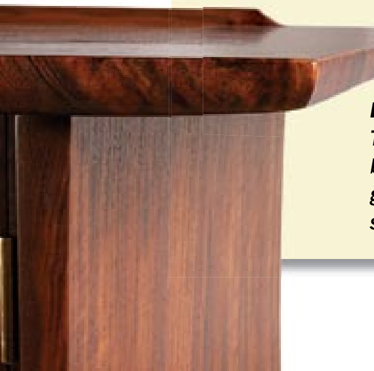
1 ***Make a template of the profile.*** *Then use the template to trace the profile on the corners.*

2 ***Mark the boundaries.*** *Extend a line across the top, indicating where the profile will end. The lines will provide a consistent stopping point for all the shaping cuts to follow.*

3 ***Round the edge with a block plane.*** *After making a few chamfers on the tablesaw, take light cuts with the plane, removing corners of the facets with each pass.*

4 ***Check your progress.*** *The template will show where you need to remove more material.*

When a roundover meets a bevel



Elegant roundover for wide overhangs. *The edges on Ted Blachly's claro walnut sideboard taper up and away from the carcase, giving a light feel to the top. The profile is also lightly chamfered along the rounded edge.*

underbevel profile, which exposes details below the top. Shorter overhangs limit the size of the edge profile to the thickness of the top, such as a bullnose or beaded edge.

Hardwood vs. softwood tops

If you are really on your toes, you'll choose a profile that works with your wood selection, whether softwood or hardwood, figured or plain.

Softwoods and hardwoods each have working characteristics that make them suitable for particular profiles. Softwoods age to a beautiful patina, but they dent easily and don't take or hold detail as well as harder woods. So for softwood tops, you may incorporate pronounced chamfers or bold profiles with less complex shaping and no sharp edges. The harder the wood, the better it holds detail, so harder tops are better for multifaceted edges.

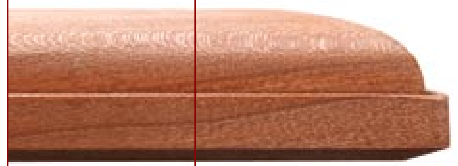
Finally, think about the figure; a tabletop with abundant figure or prominent grain may beg for a less-detailed edge that doesn't compete for attention.

Photos, except where noted: Thomas McKenna; detail shots: Kelly J. Dunton

FILLETS

Adding a fillet to a simple roundover creates a shadowline and catches light. Rough out the profile with a router, then use hand tools to customize the shape.

ROUNDOVER WITH FILLET



ROUNDOVER WITH FLAT AND FILLET

Custom edges that sing

Some woodworkers choose an edge profile based on the router bits they have. I avoid that approach because I don't want my furniture to look factory made. Production furniture has a certain look, with predictable edges—perfect 45° chamfers, blunt bullnoses, and other recognizable profiles cut with routers or shapers. The edges are good and durable, but they don't seem very creative or interesting.

However, when I create one-of-a-kind edges that fit my style, common router bits can be a starting point. They certainly make things easier. So I sometimes use a router to rough out the profile, then refine the machined edge with hand tools. Sometimes all it takes is delicate passes with a block plane or a spokeshave, or even scrapers and sandpaper.

From simple to complex, the edge profiles illustrated here can be used individually or combined to create dazzling designs.

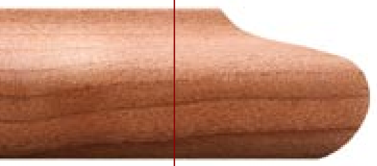
Chamfers—I often incorporate chamfers in my work to create light-catching facets along edges. A light chamfer is created by kissing the corner with a block plane. More passes with the plane create wider chamfers. The detail can be incorporated into any number of edge profiles. Chamfers can be cut at any angle, even a different angle on the top than the bottom. You also can cut multiple chamfers into an edge, creating a multifaceted surface.

Bevels—A bevel is simply a wide chamfer. Cut on the top edge or the bottom, they are often used to

Router and planes work hand in hand. *Use a quarter-round bit to remove most of the material (above). The bit will carve a fillet at the top and base of the profile. Next, scribe lines to indicate the stopping point of the handwork on top (middle). Finally, refine the edge with a block plane. Remove corners of the facets in steps until you have a round surface. You can leave fine facets to stimulate the tactile senses or smooth the surface with sandpaper.*

Complex profiles

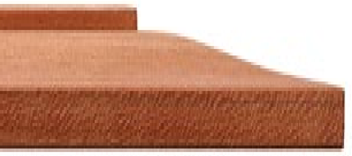
It's easy to use a router bit to get an edge on a tabletop. But you wind up with a cookie-cutter look that adds no dazzle to the design. To personalize your furniture, design your own profiles, then combine power tools and handwork to get the shape you want.



OVOLO

OVOLOS

This classic edge is simply a modified ovolo profile, created with a tablesaw, router, and handplanes. Start by making a template of the profile and tracing it on the table edge.



OVOLO WITH FILLET

1

Round the tip. *Use a quarter-round bit to rout the lower edge of the profile.*

2

Hollow a channel. *Use a core-box bit to rout the concave area of the profile.*

3

Refine with hand tools. *Following the layout lines on the edge, smooth the curves with handplanes and sandpaper.*

Combining profiles

Profile dances on edge. *David Lamb created a beaded profile that harmonizes with the other beads on this center table.*

disguise or play up the thickness of the top. Steep angles generally accentuate thickness, while wider, sweeping bevels tend to play it down, especially when used on the bottom edge.

Roundovers—Though I think of bullnose-style roundovers as a rather unimaginative staple of the modern furniture industry, these edges work well at deflecting dings in a high-traffic area. One way to make an otherwise bland roundover more attractive is to reshape it so that it's not just a radius or section of a circle; sometimes an asymmetrical roundover is best. Another way is to use just part of the full radius, so the roundover has hard edges. To add even more interest, I often lick the top and bottom of the profile with a block plane to create fine, light-catching chamfers. I also combine a roundover with other profiles, creating any number of elegant custom variations.

Complex profiles—High-style tabletops often feature complex edge profiles with multiple shapes. Here's where I use a router to rough out the profile, and then planes or custom-made scrapers to refine it. When working this way, I often create a small wooden mock-up to dial in the profile and then use it to gauge my progress on the real edge.

Beads—I use beaded profiles in many ways: along table aprons, on drawer fronts, and on legs. But they also work well as part of a table profile. I prefer to cut beads with hand tools in order to create a fine quirk (the narrow indentation on the inside edge of the bead). Bead-cutting router bits leave a wide quirk. You can combine a bead with a chamfer to create an elegant edge with lots of light-reflecting and shadow-catching surfaces. You also can incorporate multiple beads for a traditional look.

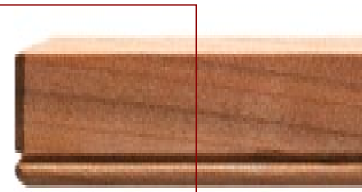
Last, make it personal

Unless you are making a strict period reproduction, it's difficult to say that one profile is better than another; it all depends on your design and taste. By adding subtle details to the basic profiles presented here, you can come up with a unique shape that fits your furniture. Explore the possibilities. For me, playing with the edges has become one more fun part of building special pieces. □

Garrett Hack is a contributing editor. Along with Hack, Ted Blachly and David Lamb are members of the New Hampshire Furniture Masters Association. Allen Eason participates in the NHFMA's prison-outreach program.

BEADS

A beaded edge works well to introduce a round surface and shadowlines in an otherwise rectilinear edge. To create beads with fine quirks, use a scratch stock or a beading tool.



BEAD WITH CHAMFER

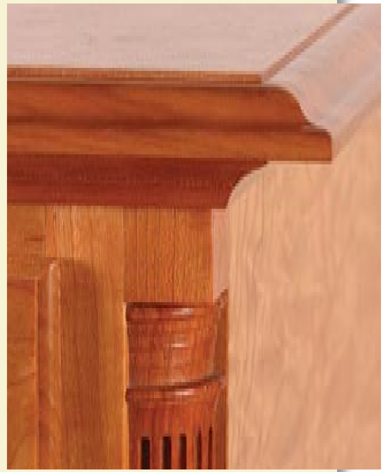
TRIPLE BEAD

Two ways to scratch a bead. *Hack avoids router-cut beads, preferring to incise them with finer hand tools. A homemade scratch stock (top) cuts custom beads and quirks. You also can use a beading tool (above) for a fine detail.*

Quirky sanding block. *To refine the bead, use a thin sanding block that reaches into the narrow quirk.*

Moldings give edges a lift

Moldings, usually applied under a shaped edge, are an easy way to add visual interest and weight to the edge. Design the molding as part of the overall shape of the edge, much like a built-up crown molding on a case. Because the tabletop gives it some protection, the molding can be more delicate. Allen Eason added a molding under the top of his Chippendale bureau. The molding mirrors the top edge and, combined with the fluted column, gives the appearance of supporting the top.



Mill Lumber Safely

A bandsaw and a jigsaw make the process less intimidating

BY MICHAEL C. FORTUNE

The switch from using surfaced lumber to milling your own boards from rough stock is a watershed for most woodworkers. It saves you money, unchains you from the standard thicknesses available in surfaced lumber, and gives you greater control over the accuracy of your work and the look of your boards.

But this business of taming roughsawn stock can be a challenge. The wood is rarely flat to start with, and it often releases inner stresses when cut that can pinch or bind a sawblade, resulting in a violent kickback.

I eliminate these dangers by using a bandsaw instead of a tablesaw for initial ripping and by using a jigsaw instead of a chopsaw for crosscutting rough stock to length. Both of these saws employ narrow blades that make them less susceptible to binding.

Besides being safer, the process I follow is simple and straightforward. Make sure your machines are set up properly and check the stock with an accurate square as you progress through these steps. Your goal, of course, is boards that are completely flat, straight, and square.

Start with the jigsaw and the bandsaw

Rough lumber that is twisted or cupped won't sit flat on a chopsaw. As the cut is made, the stock can drop into the blade, pinching and binding. For this reason, I use a jigsaw with the stock set across three or (better still) four sawhorses. A jigsaw with an oscillating cutting action and a very coarse blade will cut through the hardest wood up to 2 in. thick.

Always cut off the rough ends of the boards, which may be checked (cracked) and embedded with grit, staples, and other debris that could nick your jointer and planer knives. Now use the jigsaw to cut the rough stock into pieces that are 1 in. or 2 in. over the finished length.

The next step—cutting pieces to rough width—is the point at which many woodworkers use the tablesaw. Here's why I head for the bandsaw instead: Wood can release inner tension when sawn down its length, springing apart after being cut. On the tablesaw, the wood may bow away from the fence and into the blade, or the kerf can close up on the blade, with either one potentially resulting in a violent kickback. On a bandsaw, the short fence is less

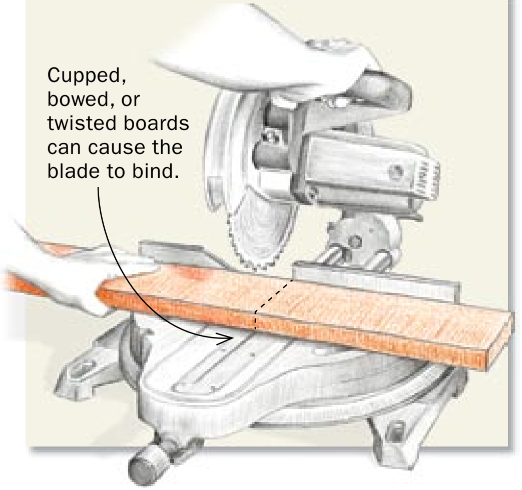
1. Cut to rough length with a jigsaw

Crosscut to rough length. *Position the sawhorses so that stock on both sides of each cut is fully supported.*

CHOPSAWS CAN BIND

Because roughsawn stock isn't flat, it won't always sit still under the circular cutting action of a chopsaw. It may fall into and bind the blade during the cut.

With a jigsaw, the vertical cutting action doesn't push the stock around. The narrower blade is also much less likely to be pinched.

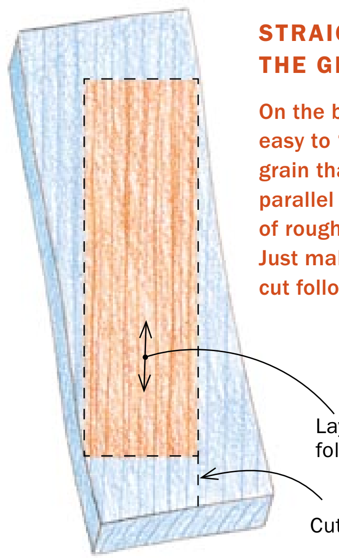


2. Layout: Snap a line or add a guide

A straight rip follows a straight line. *A carpenter's chalk line produces a bright, straight line on stock that's too long for marking with a straightedge (left). A surer path to a straight rip is to attach a piece of edge-jointed stock, nailing into the waste area of the rough board (below left). The jig's jointed edge rides the bandsaw fence and guides the stock in a straight path through the blade.*

STRAIGHTENING THE GRAIN

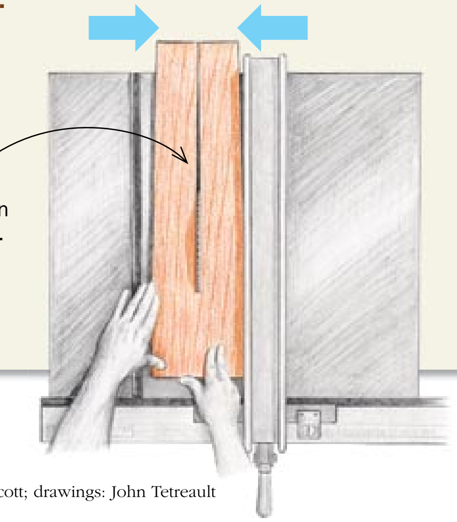
On the bandsaw, it's easy to "correct" grain that runs out of parallel to the edge of roughsawn stock. Just make your first cut follow the grain.



3. Cut a straight edge on the bandsaw

TABLESAWS CAN KICK BACK

On the tablesaw, tensions in the wood may cause a long rip to close up again behind the blade, pinching it and creating a kickback hazard. Because the bandsaw's blade is much narrower from front to back, it is much less likely to be pinched in the same way.



Rip without resistance. *Fortune sets up his bandsaw with a coarse, 3-tpi, skip-tooth blade, tracked on the centerline of the upper wheel. This makes it easy to cut thick stock. Boards without a straight reference edge can be ripped freehand (left). Or use a straight-line jig (right) to guide the stock through the blade.*

Photos: Steve Scott; drawings: John Tetreault

4. Rip to rough width

Stay at the bandsaw. *With one relatively straight edge established, you can rip your stock to rough width, about ⅛ in. over final width to accommodate any unevenness in your straight edge and for the release of any tension in the wood. Let the stock rest overnight before milling to final dimension. To provide adequate support to long or heavy stock, Fortune mounts an outfeed roller on an adjustable stand modified to mount directly to the saw's housing (below). This provides a sturdy outfeed that stays level and doesn't tip.*

likely to push bowed stock into the blade, and the blade's downward cutting action isn't aimed at the operator.

Use the bandsaw to cut the pieces to rough width, about ⅛ in. oversize. Run one straight edge of the stock along the bandsaw's fence to get a straight cut. Depending on the straightness of each piece, you may need to pass an edge over the jointer first to get this straight reference edge.

Sometimes, if I can't joint the edge because it is too wavy, still has bark on it, or has a big knot, I'll mark a pencil or chalk line and trim the entire edge freehand on the bandsaw. Most importantly, this technique allows you to lay out the first edge so the board will have straight grain.

A surer way of cutting a straight line is to attach a straightedge (a piece of plywood or long stock with a jointed edge) with a couple of finishing nails in the overlength portion of the stock. The jointed edge will ride the fence and guide the stock through a straight cut. Don't sink the nails flush; you'll pull them out when you are done.

At the jointer, flatten a face and square an edge

After the stock has been ripped to rough length and width, and after it has rested overnight, the next step is to joint one face flat. A thickness planer cannot do this job—it can only mill one side of a board parallel with the other. Inspect the stock for grain orientation and pass it over the jointer (cup side down) in the appropriate direction.

Sometimes the grain direction won't be obvious, so use several light passes rather than one heavy cut. If particularly bad tearout occurs in one area, then you still have the option to flip it end for end to reorient the grain and try again. Bear in mind that you will be removing material from the other face later with the planer. Try to balance out how much wood is removed from each face. This will help prevent an unbalanced release of tension, which would cause twist or cup.

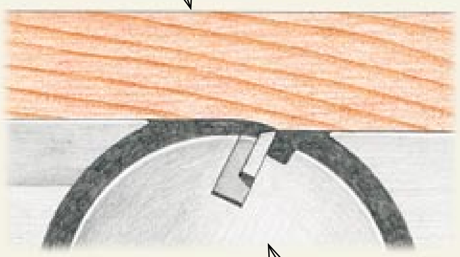
Next, if I haven't done so already, I'll joint one edge, using the freshly jointed face as

5. Joint a face and square an edge

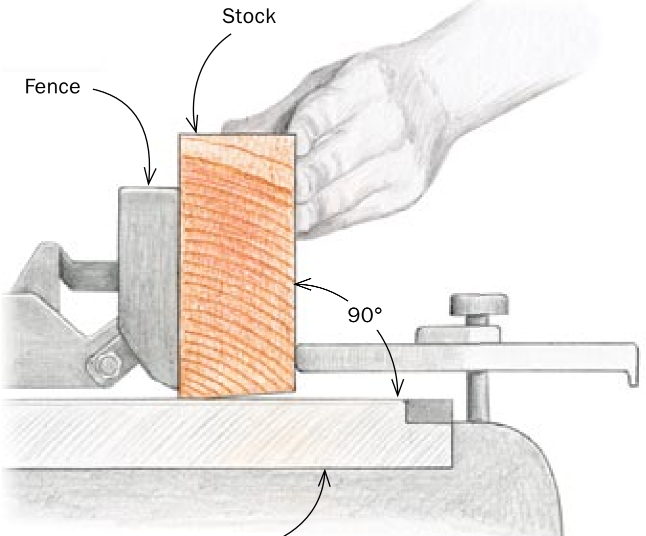
Joint a face. *Joint with the cupped side down. Take light passes until the face is flat.*

A CONVENIENT REMINDER

Grain matters. *To reduce tearout, consider the rotation of the cutterhead and the direction of the grain when deciding which way to feed a board. Fortune marks his jointer near the cutterhead for easy reference. The diagonal lines represent proper grain orientation.*



Joint an edge. *Register the freshly jointed face against the fence (left) and again take light passes until the edge is flat. If the fence is set at 90° to the jointer table, the two jointed surfaces should now be square to one another.*



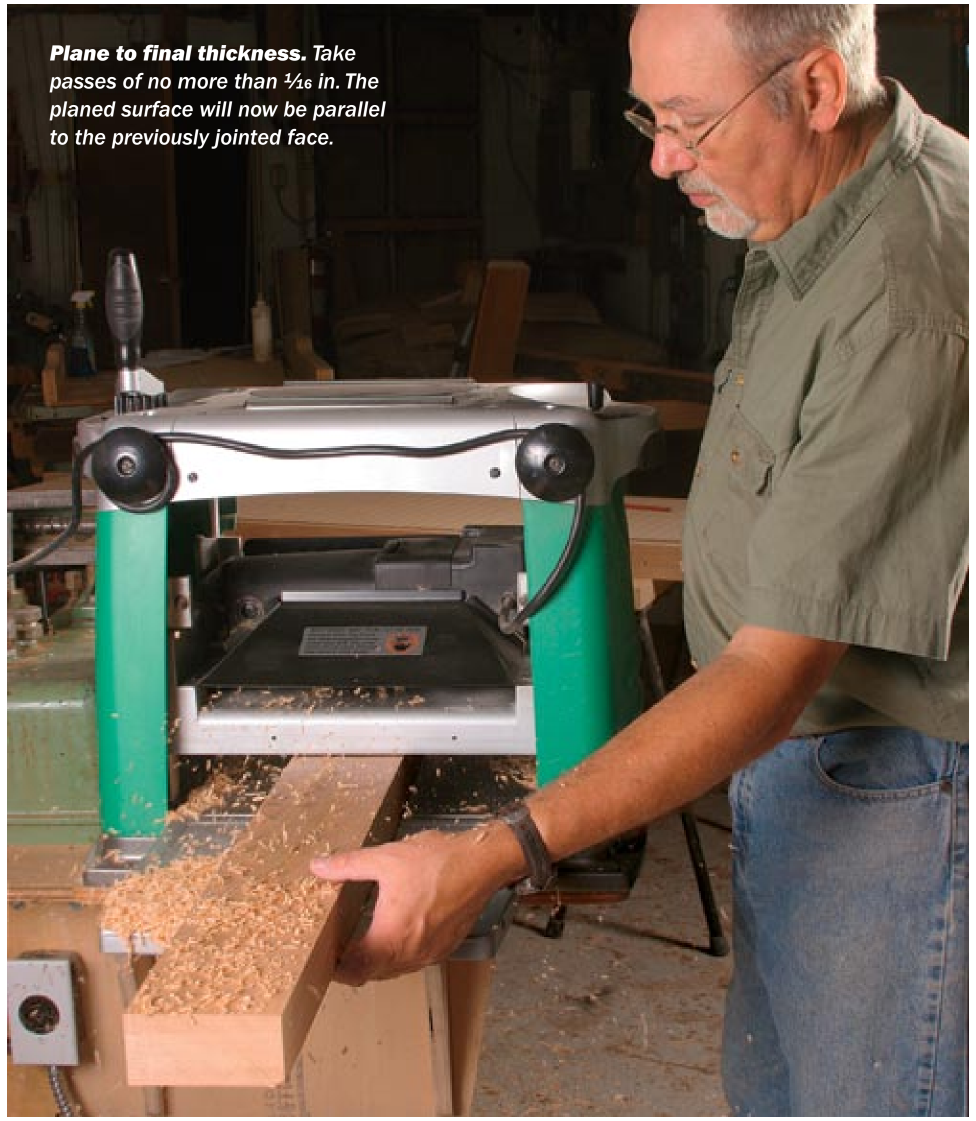
a reference surface against the fence of my jointer. Then it's back to the bandsaw.

Bring the stock to finished width and thickness

Because I usually bring the piece to finished width on a benchtop planer, I find it helpful to rip again on the bandsaw—this time to about 1⁄16 in. over finished width. This lets me take the lightest possible passes, saving wear and tear on the planer knives and ensuring the best performance. Sometimes there is so little waste material left after jointing that this step isn't necessary. But most often I'll return to the bandsaw, even if it means the blade is not fully embedded in the cut. With a properly

6. Saw and plane to thickness

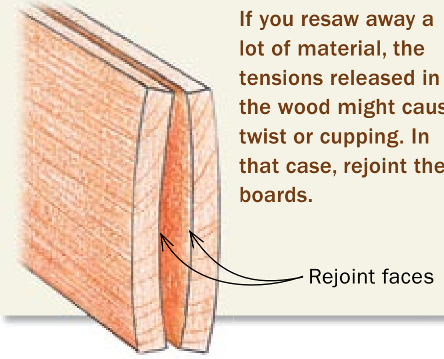
Bandsaw first? _If you still have a fair amount of material to remove, a thin bandsaw cut lets you approach final thickness quickly and avoid repeated passes in the planer._



Plane to final thickness. _Take passes of no more than 1/16 in. The planed surface will now be parallel to the previously jointed face._

REJOINT IF YOU RESAW

Taking a heavy resaw cut. _It's also possible to resaw to yield two or more boards from one piece of stock._



If you resaw away a lot of material, the tensions released in the wood might cause twist or cupping. In that case, rejoint the boards.

set up saw and an unhurried feed rate, the blade does not wander.

Next, if the stock is much thicker than the finished thickness, I'll "resaw" it (bandsaw the stock on edge) a little over thickness, about a heavy 1/16 in. If you resaw away a large amount, or to yield two or more boards from thick stock, be sure to let the pieces sit for a day or so and then re-mill as needed to alleviate any twist or cup.

Once the piece is close to final thickness, mill the unjointed face in the planer to make it parallel with the opposite surface and to bring the piece to final thickness. Again, light passes are best. Roughsawn lumber can vary in thickness; you don't want your planer to bog down if the wood increases in thickness down the length (if you've resawn the stock, this shouldn't be an issue). Also, a heavy cut will yield a rough surface and promote snipe at the ends.

Next, clean up the bandsawn edge and bring the piece to final width by standing the piece on its jointed edge and passing it through the planer. I use the 1-to-5 rule here. If the stock is 1 in. thick, I can plane a board up to 5 in. wide. If it is ½ in. thick, then the maximum width is 2½ in., and so on. Always use the center portion of the planer for this. Because the infeed rollers are mounted on either end and held in place with springs, they will tilt the wood slightly if it is put too close to either end.

If the dimensions exceed the 1-to-5 rule, then I trim to final width on the tablesaw. Because so little waste material is left, this cut is often exposed on the waste side, cutting away just 1/16 in. or so. I actually prefer this because it avoids creating narrow strips of waste that can fall into the throat plate and cause problems.

The last step is to cut the ends. If the pieces are too long to handle with a tablesaw's crosscut sled, cut them on the chopsaw. ☐

Michael Fortune is a furniture maker in Lakefield, Ont., Canada, and teaches classes throughout North America.

7. Trim to final width

Plane narrower stock on edge. _This is a safe method of trimming to width as long as the stock is no more than five times as wide as its thickness (left). Trim wider stock on the tablesaw (below)._

8. Cut to final length

Cut one end square, then cut the other to length. _Fortune makes his final crosscuts on the chopsaw (left). If the stock is too wide (above), he uses a crosscut sled on his tablesaw._

Pennsylvania Spice Box

Small chest is a craftsman's showcase

BY STEVE LATTA

When I decided to build a piece for my wife and I, to celebrate our 10th wedding anniversary, I had two important goals. I wanted it to be on an intimate scale—something smaller than a sideboard or dining table—and I wanted a piece that could be personalized.

This spice box seemed a perfect fit. It's compact enough to sit on a dresser or in an alcove, and it's great for storing jewelry and small treasures of all kinds. And, as on many original spice boxes, the inlaid decoration allowed me to personalize the box and commemorate the occasion.

Because Elizabeth and I are Quakers living in Chester County, Pa., I was drawn to the history of the spice-box form. This design is typical of those popular among Pennsylvania Quakers throughout the 18th century. Fitted with banks of small drawers and often hidden compartments, they were displayed as symbols of prosperity. The cases typically were made of walnut, the doors or central drawers veneered or inlaid with combinations of maple, boxwood, holly, cherry, walnut burl, locust, and red cedar (see Master Class, pp. 96-100). A finished spice box is small, but it contains a wealth of craftsmanship.

Start with the case joinery

The case is dovetailed, and the various rabbets and notches for the door and the back complicate the joinery a little. Lay out and

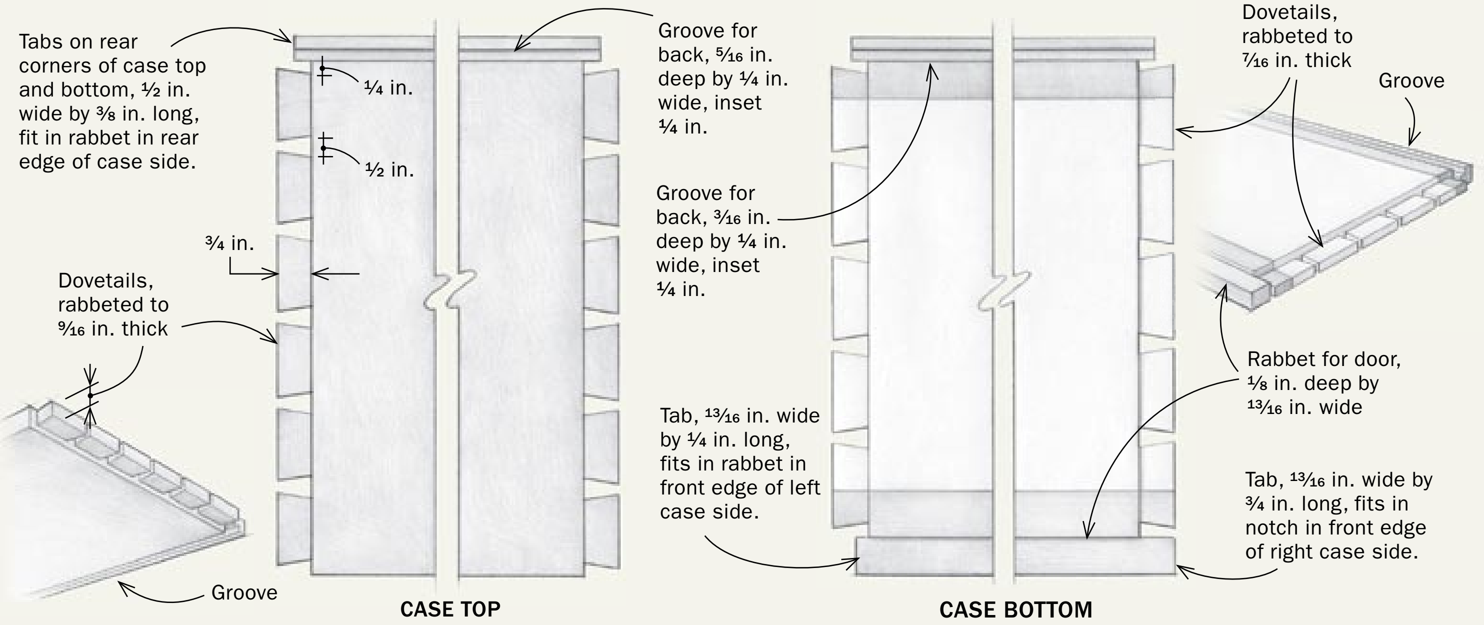
DOVETAILING THE CARCASE

Rabbeting the dovetails makes it easier to lay out the pins, and also makes the tails easier to hide with moldings. Clamp a wooden fence onto the router to make the rabbets.

Bury the bit. *Pivot the fence into the bit (left) to create a zero-clearance cavity that thwarts tearout. Adjust the fence to cut rabbets of varying depths with a single ¾-in. bit.*

Transfer the layout. *Mark the appropriate corners of the top and bottom panels (left) and cut them to fit into the side rabbets. Then scribe the pin layouts (right).*

AN ARRAY OF TABS AND DOVETAILS

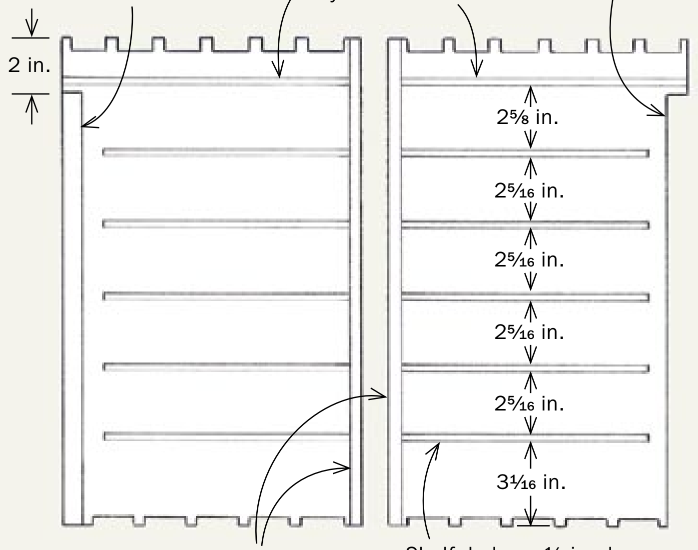


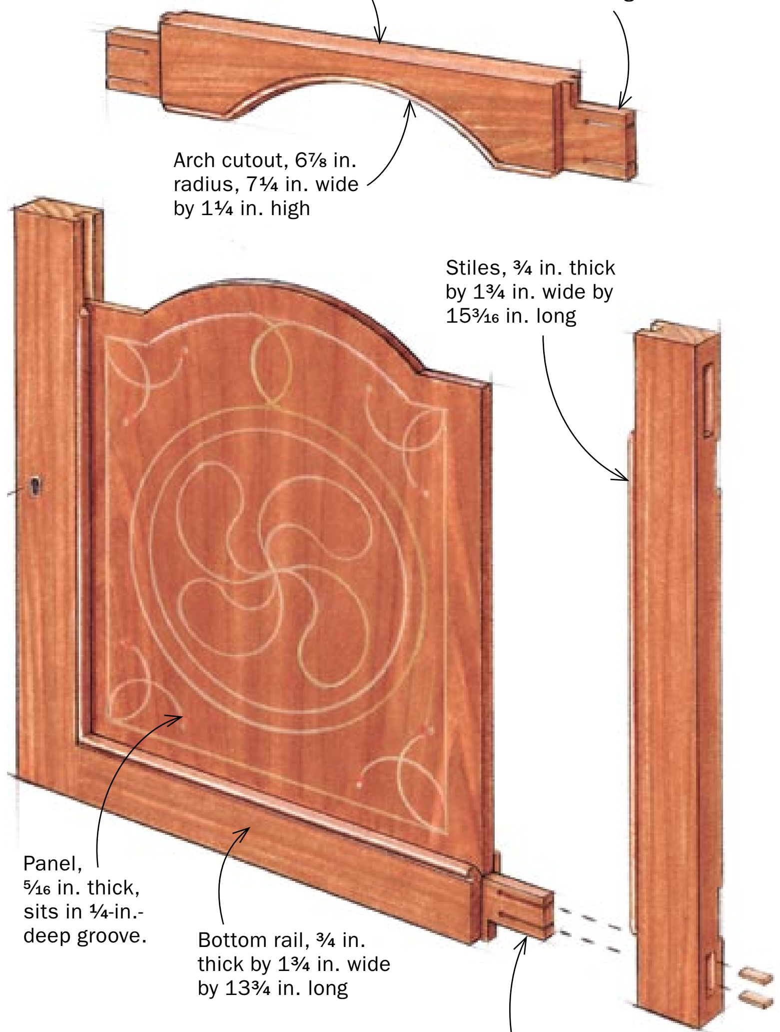
AN INTRICATE TREASURE CHEST

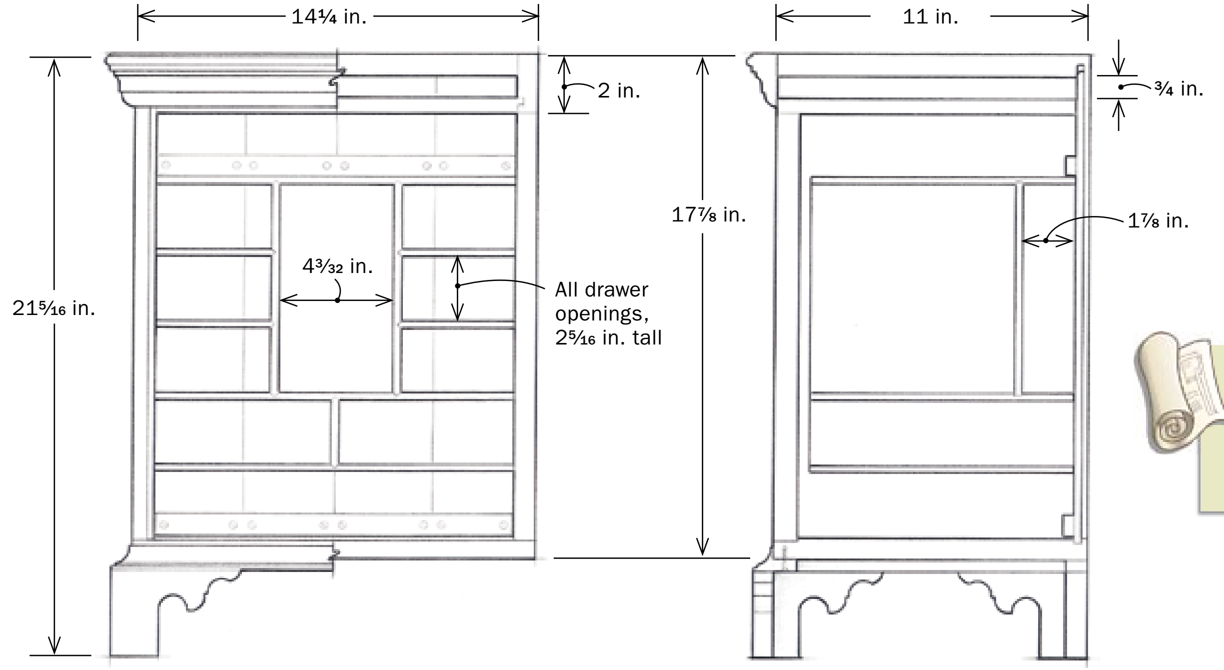
The box houses 11 dovetailed drawers with veneered fronts, and two secret compartments. The case, door, and trim are from a single walnut board. The bottom and interior partitions are poplar, glued up with a walnut strip at the front; the back is ash. Hardware is from Londonderry Brasses (www.londonderry-brasses.com).

ASYMMETRICAL CASE SIDES

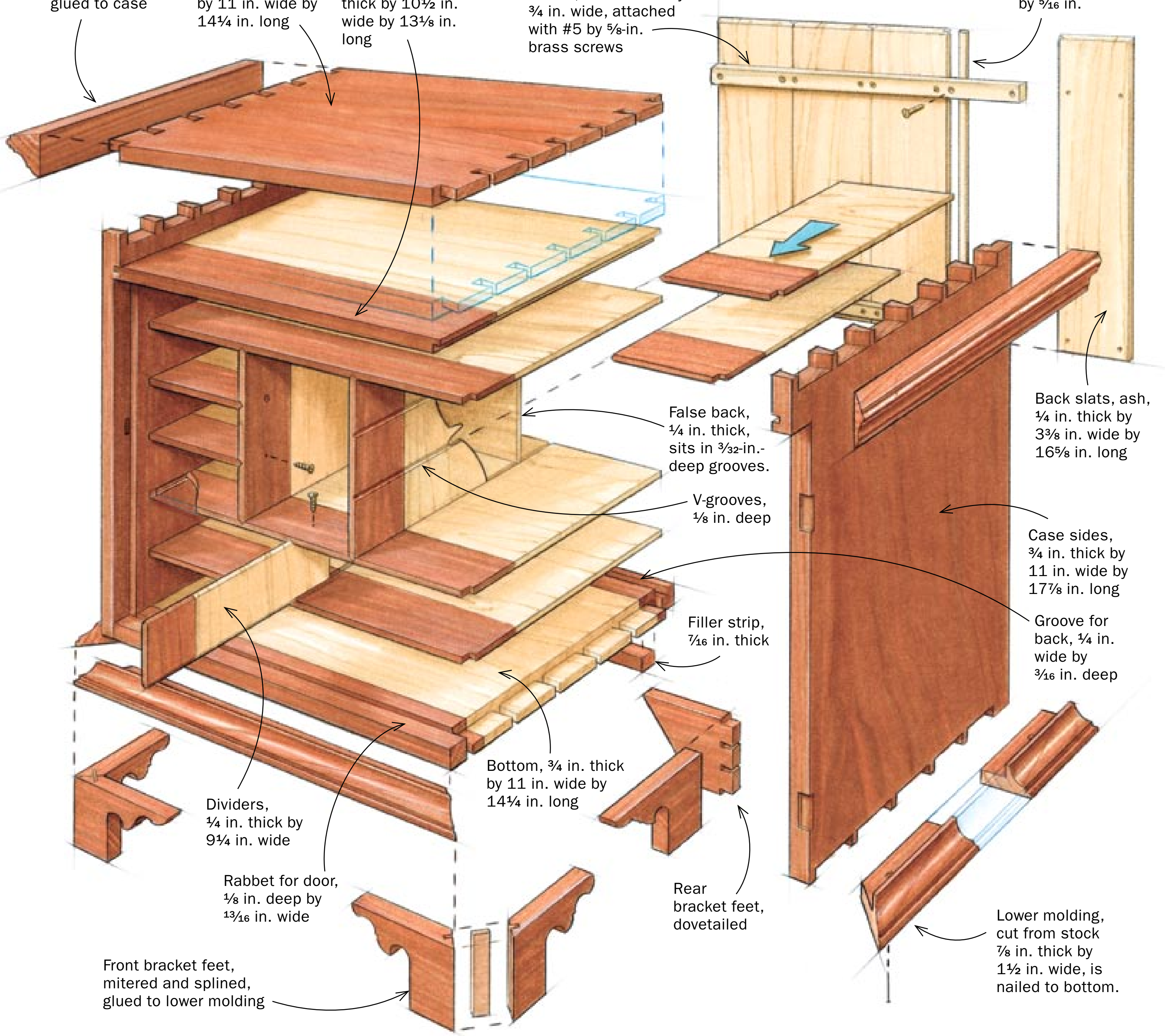
The case sides look very different up front. The door rests in a rabbet on the left side and overlaps a cutout on the right to swing out of the way of the drawers.

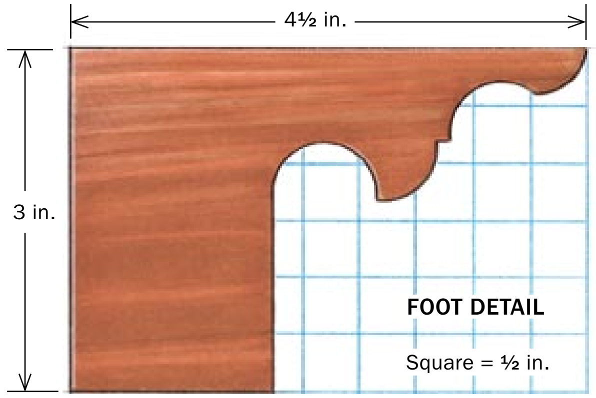




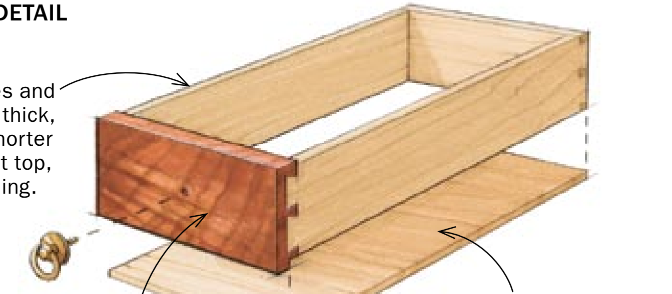


Full-size plans for this spice box and other projects are available at FineWoodworking.com/PlanStore.





DRAWER DETAIL



Drawings: Bob La Pointe

CASE ASSEMBLY

For clean, precise stopped dadoes, build this jig. *Its fence mates with the rabbet on the workpiece edge, preventing tearout at the entrance to each dado. A notch in the stop block prevents trapped sawdust from shortening the cut.*

Picture of a calm glue-up. *Latta leaves the bottom dry-fit while gluing up the top, sparing himself the panic of getting the whole case together at once.*

cut the dovetails (but not the pins yet), keeping in mind all those insets and rabbets. Next, mount a ½-in. or ¾-in. straight bit in a handheld router and "bury" the bit in a fence clamped to the base. Set the router to cut a rabbet that is ⅜ in. deep by ½ in. wide, and use this setup to rabbet the rear, interior edges of both case sides. These rabbets will receive the back.

For the front of the case, you now need to cut a stopped rabbet on the interior of the left side. When closed, the lock side of the door will fill this recess, which should be ¼ in. deep by 13/16 in. wide. Adjust your fence and bit depth, then cut the rabbet, stopping 2 1/16 in. from the top. Don't square the rounded end of the rabbet just yet. The squared end should be trimmed flush with the bottom of the false top, so wait until you've fitted the false top before taking this step. On the hinge side, the door sits in a notch 13/16 in. deep that stops 2 1/16 in. from the top.

The next step with the router is to rabbet the dovetails. Reset the router fence to cut the length of the tails. For both pieces, be sure to rabbet only the dovetails, not the notches in front and back. Before transferring the tail layouts to the end grain of the pin boards, trim the tabs at the rear of the top and bottom pieces so they fit into the side rabbets for the back. Also trim the front tab on the bottom to fit in the left-side rabbet for the door (see drawing, p. 59). Cut the pins.

Next, along the inside edges of the top and bottom, cut the grooves to receive the back panel. Cut the groove in the bottom ¼ in. wide by 3/16 in. deep. The top groove should be slightly deeper—5/16 in.—to facilitate the back panel sliding up and dropping into the bottom groove. This can be done with the router-and-fence setup or with a dado blade.

With that, all of the main carcase joinery is cut, and the pieces are rabbeted and notched to accommodate a back and a door. But before glue-up, you need to start on the interior of the case.

Prep the case for the partitions

Inside the case, lightweight and delicately joined partitions create space for 11 drawers and two secret compartments. The first of

Photos: Steve Scott

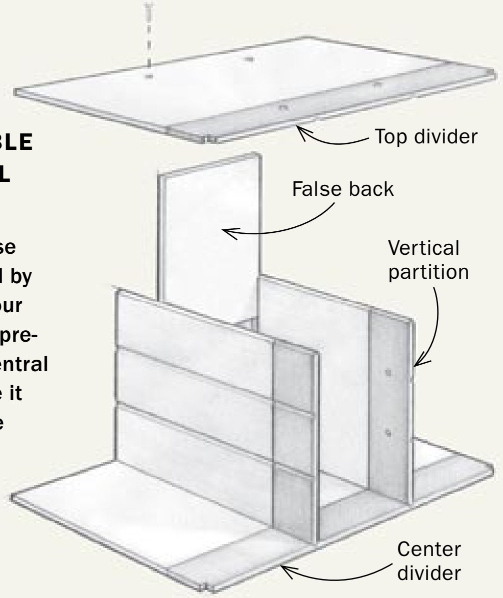
PARTITIONS

Cut partition joinery on the router table. *Set up a 90° V-bit to cut halfway through the stock's depth. The widest part of the groove should match the stock's thickness. Next, bury the bit in the fence to chamfer the mating ends, which should come to a point that is centered on the stock.*

A preventive measure. *The partition joinery will be secured in several places with wood screws. Before installing the partitions, predrill and countersink the screw holes to avoid splitting the stock.*

PRE-ASSEMBLE THE CENTRAL GALLERY

Because the false back is captured by grooves on all four sides, you must pre-assemble the central gallery and slide it into place in one piece.



Partitions slide in from the back. *Latta dry-fits the interior, fitting the pieces to one another, then removes and pre-finishes the pieces before final assembly. Screws hold the assembly together.*

these—a hidden file space ¾ in. deep—is created by a false top hidden behind the crown molding. The false top should be crosscut to length but left wide until after its joinery is cut. To hold it in the case, use a router to cut a through-dado in each case side, 1½ in. from the top. Crown molding will cover these. Using a dado blade buried in an auxiliary fence, cut a notch along the ends of the false top to fit into the dadoes.

The horizontal drawer dividers are joined to the cabinet sides with stopped dadoes ¼ in. wide by ¼ in. deep. These dadoes should stop ⅝ in. back from the front edge on the hinge side and the rabbet on the lock side. I cut these using a router jig that stops the cut and eliminates blowout along the back edge (see photos, facing page).

Once the dadoes are cut, glue up the case with the false top.

Fitting the central partitions

The lightweight partitions are joined to each other with chamfered ends fitted precisely into shallow V-grooves. These V-joints,

combined with the stopped dadoes, allow everything to be slid into the case from the back. The divider fronts are slightly rounded over and these roundovers meet seamlessly at the V-joints.

Leave the partitions wide until all of the notches, V-grooves, and front details are completed. Start by cutting the three main horizontal dividers to length. This dimension should be the side-to-side distance between shelf-dado bottoms, minus 1/32 in. to make them slide easily. Next, cut V-grooves into the faces of these dividers to accept the vertical partitions that run between them. Use a 90° V-bit mounted in a router table, riding the partitions against the fence. The bottom of the V-groove should be exactly halfway through the stock. If you have a little flat at the groove bottom, use a chisel to bring it to a point.

Now slide the three dividers into their respective dadoes and measure for the length of the vertical partitions. When you cut these partitions to length, leave them a little long.

Next, bury the V-groove bit in the fence and set it to chamfer precisely halfway through the end of the partition stock. Chamfer the bottom and top edges of the vertical partitions to a point so that they fit into the V-grooves in the three main panels. Slide the partitions into their slots and, using a straightedge, check whether the horizontal partitions are bowed. If so, shorten the verticals with a light pass of the block plane and re-chamfer. A good fit is critical.

Each of the long vertical partitions now needs a pair of V-grooves to accept short horizontal dividers. Lay out the grooves to align with the side dadoes and cut them using the V-groove bit in the router table. Slide the partitions back into the case.

Determine the length of the short horizontal dividers by measuring from the bottom of the V-grooves to the bottom of the dadoes cut into the sides. Cut these dividers to length and chamfer the inside edges. Next, notch the ends of the horizontal partitions to fit over the ends of the stopped dadoes in the case sides. This creates a nice, clean termination of the partitions into the sides. Mark the notches with a chisel or knife and cut them with a handsaw and chisel.

Once everything fits, use a 5/16-in. roundover bit and a router/router-table setup to round the front edges of all of the partitions. Use only a small portion of the cutting edge to apply a shallow roundover. This makes for a really clean look.

You can now cut the partitions to width on the tablesaw.

Fit the hidden compartment—A small box fits behind the large central cavity and is only accessible from the back of the case. Consequently, a false back made from ash, the same material as the real back, needs to be fitted in that section. Using a 1/4-in. straight bit chucked into a handheld router with an auxiliary fence mounted to the base, cut a groove to receive the false back. It is cut on the inside faces of the two main vertical dividers and between the two V-grooves on the top two horizontal dividers. Size a cutoff from the back to fit into the recess.

Next, screw all of the partitions and dividers together using #3 or #4 by 5/8-in. wood screws. Be sure to predrill and countersink to avoid splitting. Small nails would work great also.

At this stage, you should have a box and its false top glued together. All of the internal dividers are dry-fitted and cut to the right depth, with their front edges nicely detailed.

Making the back

The back is made from four 1/4-in.-thick ash slats with chamfered edges, splined and battened together. Cut a shallow groove, about 3/16 in. deep, in the edges where the boards meet, using a 1/16-in. tablesaw blade. After the panel is glued up, use a block plane to cut a chamfer along the inside of the top edge of the back panel. This chamfer allows you to lift and tip the back panel into position and then drop it into the lower groove.

Making the crown molding and feet

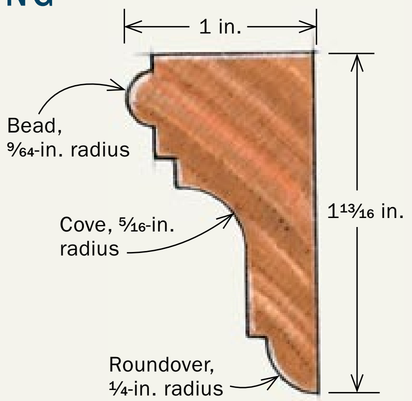
I copied the crown molding from an original 18th-century box, using a shaper and a cutter I ground to match. The molding can also be made with a combination of router bits.

The cove molding at the bottom is made from stock measuring 7/8 in. thick by 1 1/2 in. wide. Using a cove cutter mounted in the router table, scallop out the top of the molding. Cut the fillet next, using a slot cutter with the tip buried into an auxiliary fence. Following this sequence reduces the likelihood of tearout.

This molding needs to be notched so that it covers the lower dovetails and lips underneath the case. Glue a filler piece measuring 7/16 in. thick by 1 in. wide along the lower back edge of the case between the moldings. It provides a level surface for mounting the feet.

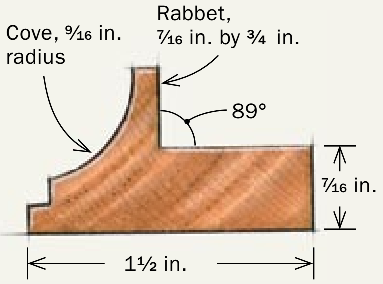
The flat bracket feet are made from 1/2-in.- to 5/8-in.-thick stock that's 3 in. wide. I prefer to use a straight grain that brings the eye to the center of the piece. The front feet are made from sequentially sawn pieces that are mitered and splined. Cut the groove for the spline on the tablesaw using a 45° block mounted to a miter gauge. Cut the spline from 1/8-in. stock whose grain runs parallel to the grain orientation in the feet. After the miter joint is cut, lay

CROWN MOLDING



Attach the crown molding. *Cut a shallow V-groove along the molding's bottom edge to capture excess glue and reduce squeeze-out. Molding cutoffs serve as cauls to create a square clamping surface.*

BASE MOLDING

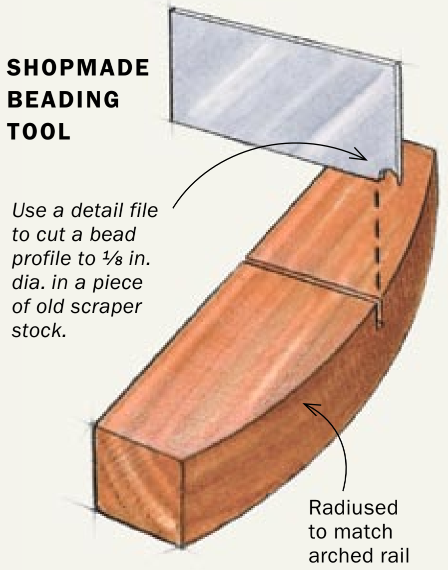


The cove molding is notched. *The lip provides a nailing surface for attaching the molding from underneath. Make the first tablesaw cut a degree out of square for a snug fit against the case.*

BRACKET FEET

The front feet are mitered. *For glue-up, place a piece of 2-in. packing tape over the outside of the joint. Pre-treat the end grain with a light layer of glue. After adding more glue and folding the miter together, insert the spline. Latta clamps the assembly with a wide, double-wrapped rubber band. He uses the negative-image offcuts from the scrollsaw (right) as cauls for gluing the feet to the cove molding.*

ARCHED DOOR



This scratch stock is built for curves. *The block is shaped to match the radius of the door's arched top. Stop the bead short of the corner and clean it up with a chisel.*

Miter the beaded corners. *A simple cutting guide makes it easy to pare the corners cleanly at 45°.*

Sturdy frame for a picture-perfect panel. *The door's inlaid panel slides into a frame joined with mortises and wedged through-tenons.*

out the foot detail and cut it out on the scrollsaw. The rear feet are dovetailed. I broke from tradition and used primary wood for the rear return because the back of the chest would be visible. After the four foot glue-ups are dry, glue them to the lower cove molding, making them flush to its front edge.

Making the door

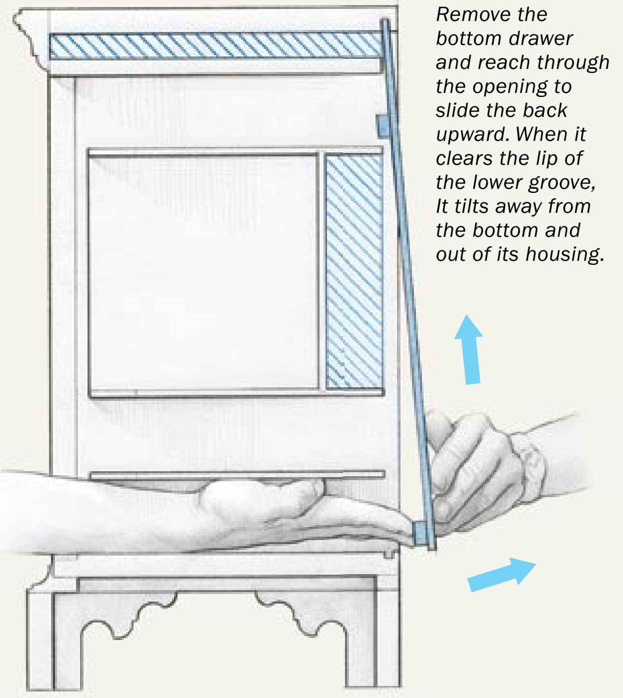
Mill the door stock in stages and leave the stiles and rails a couple of inches overlong and at least ¼ in. to ⅜ in. extrawide, even after reaching final thickness of ¾ in. Cut the arch in the approximate center of the top stile. Lay out the curve and cut it with a bandsaw; clean up the sawmarks with a card scraper.

The straight inside edges of the door frame are beaded first—on both the inside and outside faces. To cut the beads, I use my slicing gauge and define the inner line on all of the components, and then use a detail file to rough in the radius on the edges. I use a shopmade scratch stock to define the bead. (See "Scratch Stocks," FWW #163, pp. 62-65). With a white-lead pencil, mark what will be the top of the bead and scrape only until the lead disappears. This helps guarantee an even bead without too many high or low spots.

For the arched rail, bead the flats on both sides of the arch, being careful not to run all the way to the corners. Remount the scratch stock into a block of wood radiused to match the curve in the rail and bead the arches. Using a chisel, small knife, gouge, sandpaper, or other means, blend the corners together on the arched piece.

Once all the edges are beaded, cut the pieces to final length and width, keeping in mind that the door is oversize and will be taken to dimension later. Lay out and cut the 5/16-in. through-mortises, centered along the thickness of the stock, leaving about 7/32 in. on each side. Next, plow a ¼-in.-deep groove the same width as the mortise along the internal edge of the stiles and rails. I use a slot cutter on a router table, clamping on an auxiliary fence and

REVEALING HIDDEN COMPARTMENTS



making sure the tip of the cutter is buried in the fence where it would make contact with the stock. I shaped another auxiliary fence for the arched portion of the top rail, setting it up so it was also just ¼ in. deep.

I cut the tenons on the tablesaw and hand-pared the internal miters using a guide block. Because the groove is deeper than the ⅛-in. bead, do a sample to figure out the quirks. The tenons need a ⅛-in. haunch to fill the groove. Because it is such a small door, I did not bother angling the haunch in, as I would on larger doors. Cut the tenons for wedges and, with the door dry-fit, turn to the panel (see Master Class, pp. 96-100).

Once the inlay is done, glue up the door. Because of all the miters and the need to fuss a little, use white glue and take advantage of its extra open time. With the door clamped, make sure it is flat, pound in the wedges, release the clamps, and let the door dry.

Size the door to the opening, mortise in the lock and hinges, and hang it in the case. I typically line up the hinges with the rails. To calculate the location of the lock mortise, use machinist's blue/white correction fluid on the end of the bolt. With the door closed, turn the key, forcing the bolt against the case side. Cut the mortise with a small chisel. To finish the case, door, and drawer fronts, I padded on several coats of garnet shellac. □

Online Extra

For a step-by-step finishing recipe, go to **FineWoodworking.com/extras.**

Contributing editor Steve Latta teaches cabinetry at Thaddeus Stevens College in Lancaster, Pa.

Hidden treasure. *Both hidden compartments are accessed from the back of the box. The shallow space above the false top conceals documents. The deep box in the alcove can hold small valuables.*

Authentic Shaker Knobs

Turn and attach a classic knob in minutes

BY CHRISTIAN BECKSVOORT

I make mostly Shaker furniture, so a number of my pieces have Shaker-style knobs—commonly called mushroom knobs—mounted to the doors and drawers. Although you can buy them, I prefer to make them. Commercial versions come in limited sizes. Plus, some of them don't quite have the graceful curves that are the hallmark of a classic Shaker knob. I'm also free to use any wood species.

Then, too, when I make my own knobs, I can size them in proportion to the drawer front. For example, I make a 15-drawer chest that has 2¼-in.-tall top drawer fronts and a 5½-in.-tall bottom drawer front (see photo, left). That piece has eight different knob sizes, varying from ⅝ in. dia. to just under ⅞ in. dia., in increments of 0.025 in., or just under 1⁄32 in.

After 30-plus years of turning these knobs, I've managed to learn a few tricks that help get the job done quickly and efficiently. In fact, I now turn a typical 1-in.-dia. knob in about eight minutes.

Early on, I realized that the tenon diameter is the only critical dimension on a knob. The tenon must fit snugly into its hole. Too big and it won't fit; too small and the joint strength is compromised. And extra glue won't correct the issue.

So rather than turn the tenons on a lathe and have to deal with some inevitable inaccuracy, I use a drill press with a ⅜-in. or ½-in. tenon-cutter (depending on the knob size) to do the work. A tenon-cutter creates perfect tenons every time. You can order one for between $20 and $25 from www.woodworker.com.

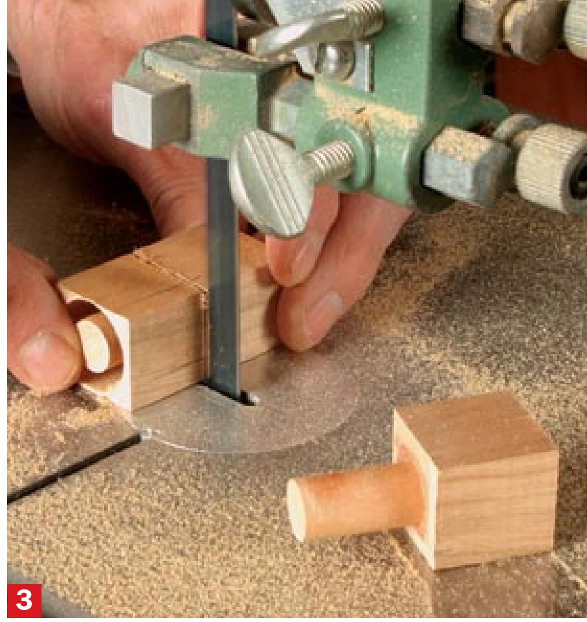
For any knob to look good, it must have correct proportions. When turning a Shaker mushroom-style knob, I make the exposed length the same as the diameter. Add about 1¼ in. to the rough blank to accommodate a 1-in. tenon and the turning process.

Contributing editor Christian Becksvoort is a professional furniture maker in New Gloucester, Maine.

MAKE THE TENON AND ROUGH-TURN THE BLANK

1 ***Center the blank.*** *Draw diagonals on the end of a square blank. Mount a drill bit in a drill press, and support the blank with two blocks screwed to a plywood base. Shift the base until the center of the bit is centered on the blank. Then, clamp the base to the drill-press table.*

2 ***Cut the tenon.*** *Clamp the blank to the blocks and replace the drill bit with a tenon cutter. Set the drill-press speed to 1,200 rpm for a ⅜-in. tenon cutter and 1,000 rpm for a ½-in. cutter. Set the depth stop at 1 in. and make the cut.*



3 ***Set it free.*** *Measure the tenon depth and mark it on the outside of the blank. At the bandsaw, using the mark as a guide, make a cut into all four sides about 3⁄16 in. deep, or as deep as you can go without cutting into the tenon. The last cut frees the outside ring.*

Rough in the outside. *Slip the tenon into a three-jawed chuck, leaving about ¼ in. of the tenon exposed. Set a caliper to the desired knob diameter, and then use a gouge to turn the blank from square to round (4). Check your progress frequently. You've arrived at the correct size when the caliper just clears the turning (5).*

4

5

6

7

Turn the shoulder. *Use the same caliper setting to mark the knob length, measuring from the front of the blank (6). Use a parting tool or a beading-and-parting tool to undercut the base of the knob by a few degrees (7).*

Photos, facing page, this page (top left), and tool shots: Michael Pekovich

TURN THE CURVES

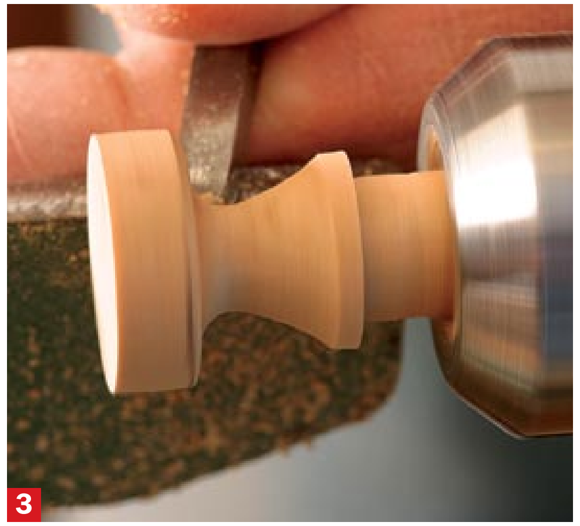
1

Mark the rim. *With a pencil, mark the location of the outside rim of the knob about ¼ in. from the end.*

2

Begin to turn the stem. *Using a small gouge, start to turn the profile behind the rim of the knob.*

How to tame a tricky area. *Use a small round-nose scraper to shape the tight curve behind the rim (3)***.** *Once close to the desired shape, use sandpaper wrapped around a dowel to make a smooth radius (4).*



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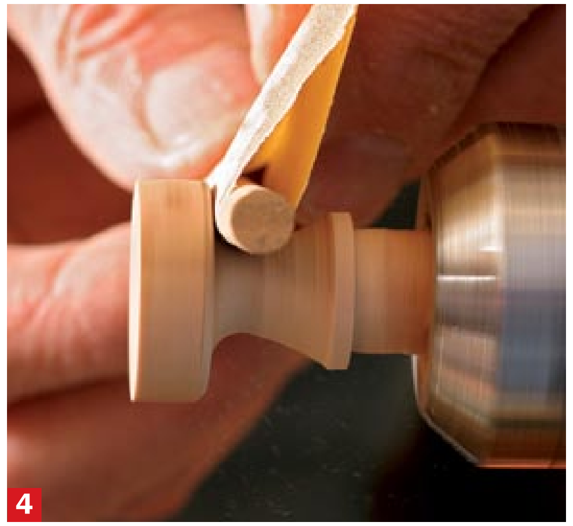
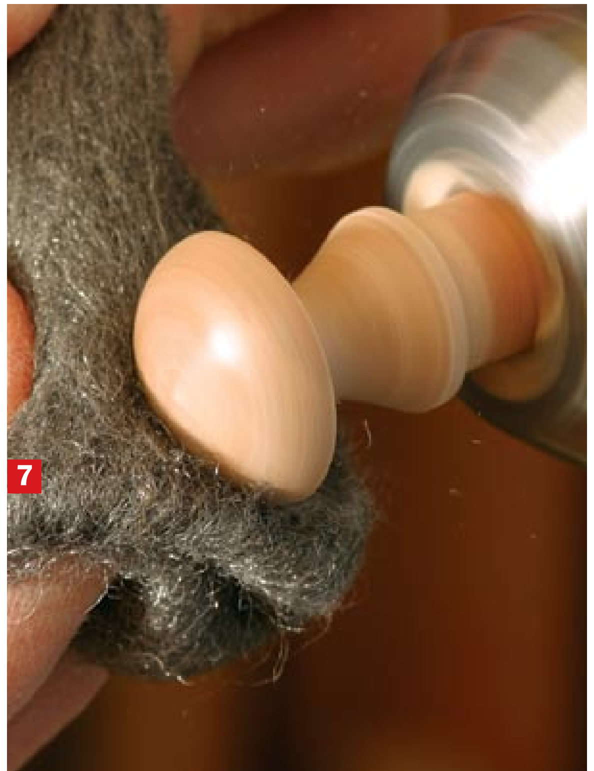


4

5

Shape the cap. *The small round-nose scraper is used once again, this time to turn the flared cap on the end of the knob. Avoid reducing the diameter at the rim of the cap.*

6



7

Sand the knob. *With the knob spinning, start sanding with P150-grit paper, then P220-grit (6). Avoid rounding the edge of the cap. Polish the cap with 0000 steel wool (7).*

CUT THE TENON TO FINAL LENGTH

A helpful jig. *The knob can spin out of your hands if cut freehand on the bandsaw. The cut will be safer and easier if you make a little carriage. It also makes it easier to get a square cut. To make the jig, drill a hole for the knob's tenon in a piece of stock. Then saw that piece in half as shown.*

Trouble-free trimming. *Place the tenon in the carriage, with the shoulder butting against the jig. The jig secures the tenon, holding it level while allowing the knob to clear the bandsaw table.*

ATTACH THE KNOB

Tenon too big? *If damp weather causes the tenon to swell, it can be made to fit without much fuss. Slip the tenon into any vise and squeeze. Repeat, turning the knob slightly each time until the entire circumference of the tenon has been slightly compressed. Once glue is added, the compressed wood will swell, creating a super-tight fit that's sure to hold fast.*

Handle with care. *Rather than attach a knob by tapping it with a mallet or hammer, which can dent, deform, or even break it, squeeze the knob into place using a hand screw with a strip of leather taped to the jaws.*

Photos, except where noted: Tom Begnal

Wood Planes Made Easy

Make a smoothing plane to rival the best metal ones on the market

BY DAVID FINCK

Make a wood plane and it will reward you with flat, gleaming wood surfaces and an unmatched planing experience. Make it the way I describe here, and you'll be surprised how easy it is. Wood planes offer great value, too. They far exceed the quality and performance of less-expensive metal planes, and you can build several of them for the price of one high-end plane. Their thick blades make freehand honing easy, and the high-quality steel holds a great edge. Last, they are shaped to fit your hands, so the comfort factor alone is a good reason to explore them.

Often called a Krenov plane, this plane style is closely associated with cabinetmaker and author James Krenov, who adapted the design of commercially made European wooden planes. Gluing on cheeks eliminates the need to hollow a solid block.

Plane-making is not difficult, and it is a great way to learn many fundamentals of woodworking. This article should serve intermediate-level woodworkers well; for those seeking more guidance, my book, *Making and Mastering Wood Hand Planes*, (Sterling, 2005) starts at square one.

Prepare the plane blank

Straight-grained stock will yield a stable body. Choose well-dried wood of good density and durability. Among domestics, oak, ash, hard maple, Osage orange, mulberry, and applewood are good choices.

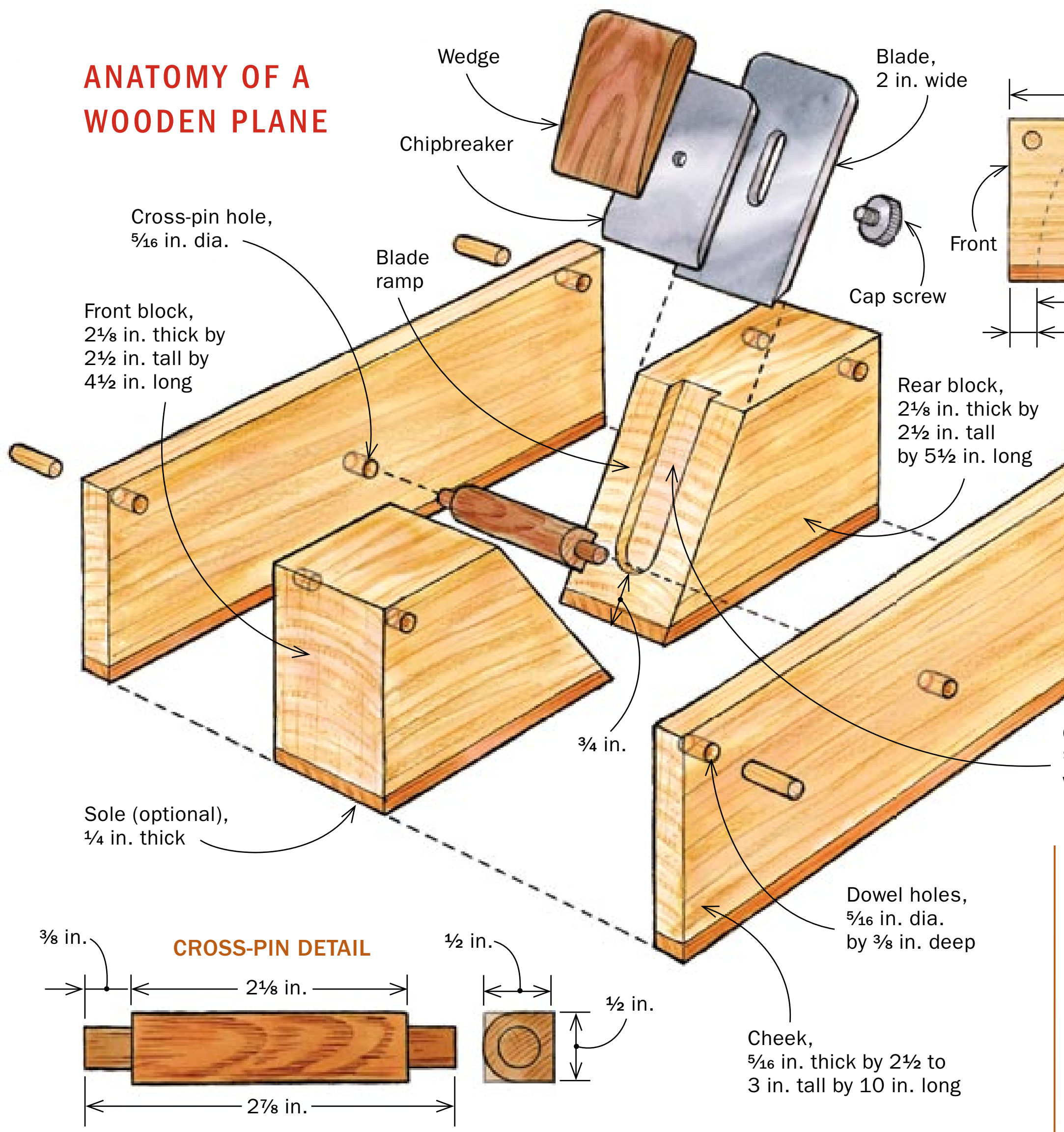
To make a smoothing plane, square up a thick block (this can be glued up from thinner pieces) 3-1/16 in. wide by 10 in. long by 2-1/2 to 3 in. tall, with its two sides parallel and square to the bottom. The top can be left rough-sawn as it will be trimmed away when shaping the plane. Examine the sides of the blank. If the grain slopes noticeably, choose the front of the plane so that the grain direction slopes downward from front to back. This helps the plane slide smoothly and prevents chipout on the bottom.

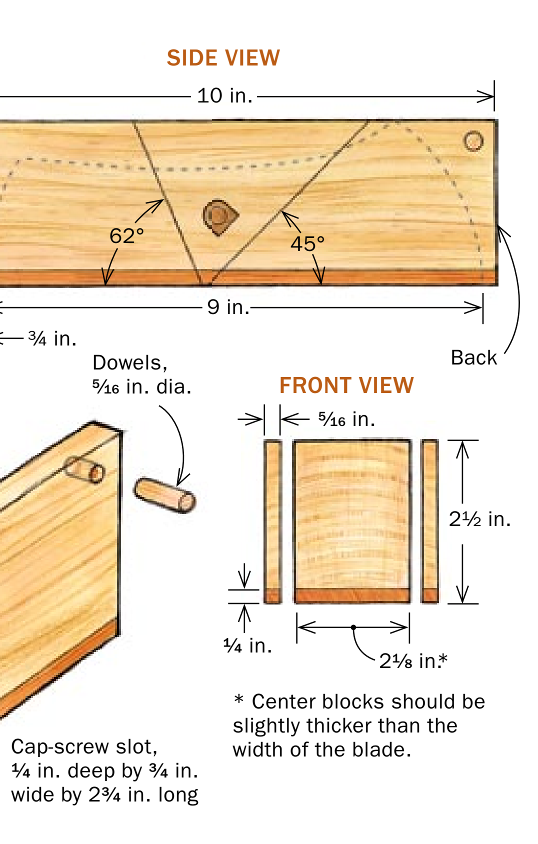
A plane will hold up fine without a separate sole (and the next step can be eliminated), but planes tend to wear most in the area in front of the throat opening, so a small square insert may be required after a lot of use to compensate for wear. If you will use the plane daily, apply a sole of especially hard-wearing wood, such as lignum vitae, jatoba, or ironbark, to the plane blank. Glue the sole (1/4 in. thick and 1/8 in. wider and longer than the blank) to the bottom of the plane blank, using a caul under the clamps to distribute pressure. Use

ONE METHOD, MANY PLANES

Once you know the basics, you can make an arsenal of planes—for everything from chamfering small parts to jointing long edges. A small hammer is used to adjust the planes.

ANATOMY OF A WOODEN PLANE





Sources of Supply

This Krenov-style plane is built to fit a 2-in.-wide plane iron. Plane-iron assemblies include a chipbreaker and a cap screw, and come in a range of widths: 1, 1-1/4, 1-1/2, 1-3/4, and 2 in.

PLANE-IRON ASSEMBLIES

David Finck, www.davidfinck.com
A2 Steel, 2 in., $58.

Hock Tools, www.hocktools.com
High-carbon steel, 2 in., $52.

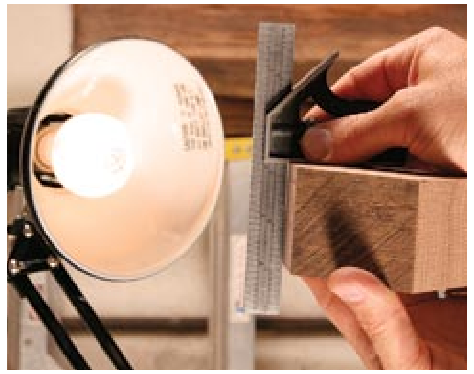
BUILT FROM ONE BLOCK

Saw off the cheeks. *After gluing on the sole and trimming everything square and flush, cut away the 3/8-in.-thick cheeks. This should leave the center block about 3/16 in. thicker than the blade width.*

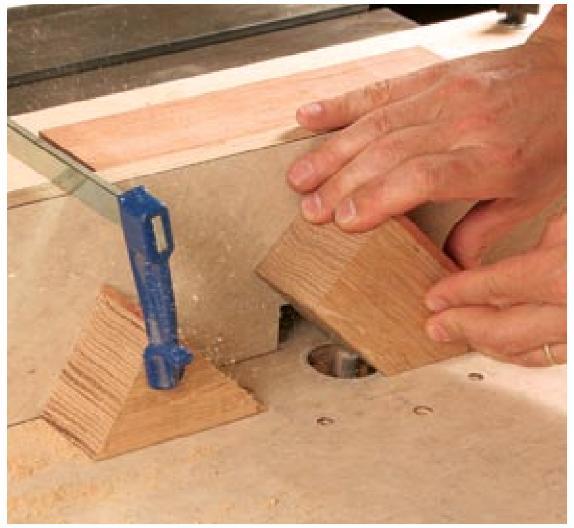
Bandsaw the front and back blocks freehand. *You can use a chopsaw or a tablesaw to make this cut more cleanly, but the bandsaw is safest and the cuts will need to be smoothed regardless. Set aside the triangular waste piece for later use.*

Photos: Anissa Kapsales; drawings: Stephen Hutchings

TRUE THE BLADE RAMP



Plane the ramp and check for square. *Light passes with a block plane clean up the ramp surface (left). An accurate square and a light source help to make sure the blade ramp is square to a side (above). Here, it's still a bit off.*



Rout the cap-screw slot. *This stopped slot is centered in the ramp and is 1⁄8 in. wider than the cap screw. Lay out its stopping point (above). On the router table, use triangular scrap as a stop (right).*

a block plane to trim the overhanging sole flush to the sides of the plane blank.

Cut the cheeks and center block

Cut the blank into three pieces: two cheeks and a center block. After cutting the pieces slightly thicker, mill the cheeks and the center block to finished thickness. The center block is slightly thicker than the 2-in. blade width to allow for lateral adjustments.

On the thick center block, lay out and cut a 45° angle (a good all-purpose cutting angle) for the blade ramp and a 62° angle (provides adequate clearance between it and the cross-pin for fingers to remove jammed shavings) for the front block.

Truing the back block is critical

The blade ramp must be trued to perfection: dead flat across the width and length and squared to one side with no trace of wind or twist. Any imperfections will allow the blade to pivot out of adjustment in use. Start with the front block for practice, because the only thing of importance here is to keep the ramp of the block square to a side. An experienced block-plane user will knock this off in 60 seconds. A novice may spend an hour, but taking the time here ensures the success of your plane.

Move on to the blade ramp. The blade ramp must be slotted to provide clearance for the cap screw. The cap screw should not bottom out in the slot before the blade extends beyond the sole.

Assembly is simple but precise. Space the front block and blade ramp so that after glue-up, the blade does not slide through the opening, but contacts the front block 1⁄16 in. from the bottom. Then true the bottom and file the front block for a minimal throat opening. Clamp everything and insert dowels to lock in the alignment.

The cross-pin sits between the cheeks and contacts the wedge, capturing the plane-iron assembly against the 45° ramp. Mill straight-grained hardwood ½ in. sq. by 12 in. long for cross-pin stock. Unclamp the plane and remove one cheek. Pivot the blocks out of the way and draw a horizontal line on the other cheek 1¼ in. from the bottom (the height of the center of the cross-pin). Pivot the blade ramp into location. Place the blade on the ramp and the chipbreaker on the blade. Mark a line 7⁄16 in. from the chipbreaker (the thickness of the wedge plus half the cross-pin). Those marks meet at the center point of the cross-pin, where you drill the hole for the tenons.

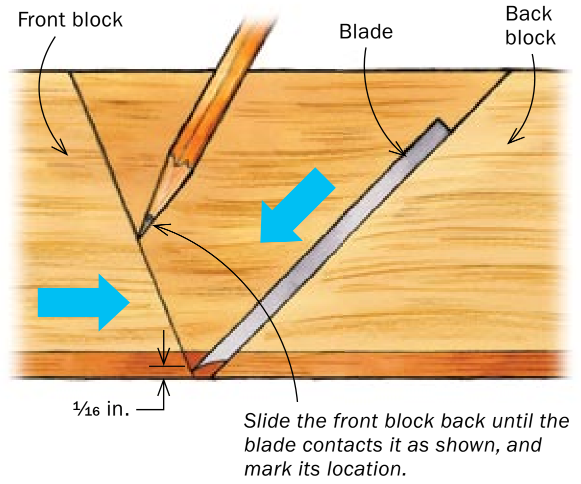
The cross-pin has rounded tenons on each side and is inserted without glue. The tenons should turn easily but not wobble. Use a file to lightly round the edges of the cross-pin that contact the wedge, and give the other two edges a more pronounced rounding.

Glue up the plane and true the bottom

Before the final glue-up, dry-fit the plane with the cross-pin installed, check all the

ALIGN THE PIECES PRECISELY

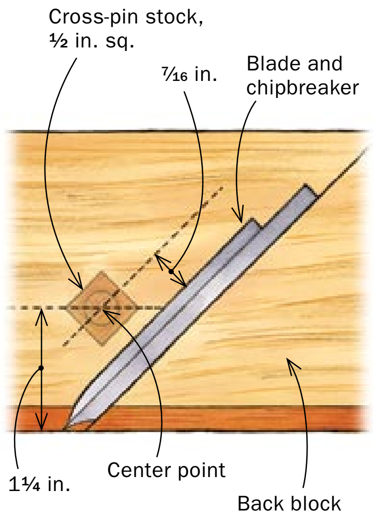
Mark the position of the ramps. *Place the back block flush with the back and bottom edge of a cheek and mark its location. Set the blade in place and jockey the front block so that the blade contacts it 1⁄16 in. above the sole. Trace its location on the cheek.*



Dowel the cheeks in place. *Drill a 5⁄16-in. hole in each upper corner, going through the cheek and about 3⁄8 in. into the blocks. Tap in 5⁄16-in. dowels, then trim them off.*

POSITION THE CROSS-PIN

Locate the position of the cross-pin. *Place the blade on the ramp and the chipbreaker on the blade. The cross-pin's center point meets at the point 1¼ in. above the sole and 7⁄16 in. from the chipbreaker.*



Drill cross-pin holes. *For best results, use a brad-point bit and a backing board beneath the cheek. Drill the first hole through the inside face of one cheek while the other cheek is removed (left). After drilling the first hole, assemble the plane and position it with the drilled cheek up. Use the first hole as a guide for drilling the second (right).*

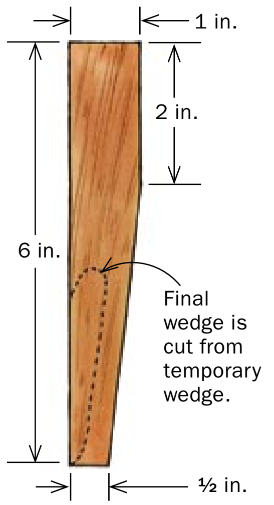
Make the cross-pin. *Finck uses a tablesaw and sled to form square tenons (left). Then he rounds the tenons with files (above) and shapes the cross-pin. Dry-clamp the plane to make sure the cross-pin will rotate freely; if not, work on the fit.*

ASSEMBLE THE PLANE AND FLATTEN THE SOLE

Glue the plane together. *Keep the glue ¼ in. away from the angled surfaces to minimize squeeze-out in the plane opening (left). Do not glue the cross-pin. Clamp an alignment stick to the bottom, and use cauls to distribute the pressure on the cheeks (right). After the clamps are set, remove the alignment stick so you can clean up any squeeze-out on the bottom and in the opening.*

seams, and erase any pencil marks. Trim the ends of the cross-pin tenons and indexing dowels flush to the cheeks. After the plane has been glued up, a temporary wedge keeps the plane body tensioned (without the blade in the plane) so you can true the plane bottom with a jointer. Straight-grained, easy-working wood like walnut or cherry is a good choice for wedges. Set the wedge and clean up the bottom of the plane. Then try the blade in the plane (bevel side down). It should bump against the front block. Take passes on the jointer until the blade is within 1/32 in. of the bottom, but doesn't pass through the opening. Lightly sand away machine marks on a flat reference surface.

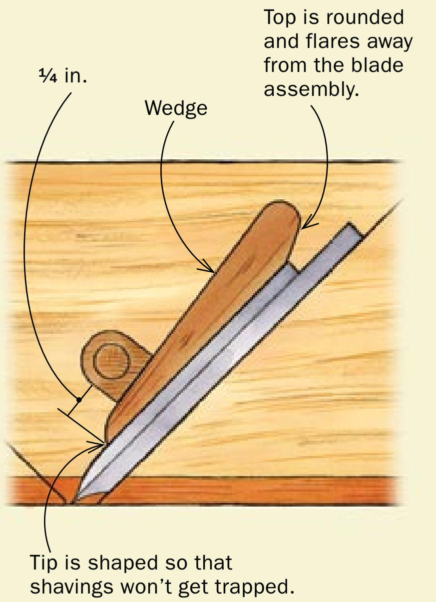
TEMPORARY WEDGE



Install a temporary wedge and flatten the sole. *Mill stock the same width as the plane iron. Bandsaw the wedge and smooth it with a few plane strokes. Tap the wedge lightly in place until the plane takes on a ringing tone, like a solid block of wood. Once the wedge is set, a light pass or two on the jointer will clean up the bottom of the plane (right).*

THE FINAL WEDGE

Cut the final wedge. *Bandsaw the permanent wedge from the temporary one. The new wedge shares the flat bottom of the old one and should fit between the cross-pin (extending about ¼ in. beyond) and the blade-chipbreaker assembly.*



After a few small adjustments to the throat opening (see photos, facing page), convert the temporary wedge to a permanent one. Light finger pressure should snug up the wedge without skewing it to one side or the other. It should fit perfectly, without any bumps.

Cut the wedge a bit shorter than the end of the blade. Shape it so that the upper end can withstand hammer taps and flares away from the blade assembly. The tip is sharp, but the rounded top allows shavings to roll over it smoothly. Be sure that the end of the cap screw does not touch the wedge. If it does, either shorten the screw or cut a relief on the back of the wedge.

Take the shaping personally

Shaping the plane is as personal as making furniture. I favor shapes that allow flexibility,

TUNE THE MOUTH AND SHAPE THE PLANE

Adjust the throat opening until the blade protrudes. *Properly filing the throat opening is critical to the success of the plane. Use a sharp mill bastard or smoothing file (left). The process is a matter of sighting the blade against the opening, filing, sighting again, and so on, until the blade slips evenly through the opening. The optimal opening is slightly thicker than a fine shaving (right).*

Bandsaw the shape. *Sketch the outline of the plane on a cheek and bandsaw it. It isn't necessary to shape the plane all at once. Shaping can be done in stages, after using the plane to get a sense of how it fits your hands.*

for I sometimes pull the plane, sometimes push it, sometimes rock it from side to side, and sometimes hold it one-handed. Therefore, I like gentle curves that invite the hand without locking it into one grip.

Don't give in to the temptation to shape the plane all at once. Shape in stages, using the plane in between to get a sense of where to shape more.

Keep the leading lower edge of the plane crisp to help push stray shavings off the board. If it's too rounded, stray shavings will go under the plane and jam the opening. Lightly bevel the underside of the cheeks to within about 1/16 in. of the throat opening to reduce friction and burnished stripes on the planed surface.

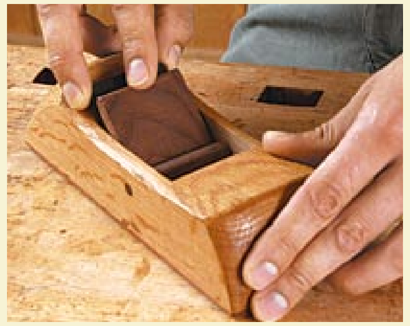
First shavings

Use a small adjusting hammer to set and tap the blade and wedge into place, then set the blade depth and check for parallelism. The shavings should look lacy and feel cottony-soft. Hone the blade more heavily at the corners to yield a wide shaving that thins to nothing at the edges. This will create a surface with no gouges or digs. □

David Finck designs furniture and lighting and makes acoustic guitars in North Carolina.

Shaping with hand tools. *You may leave the plane rough-sawn for a grip-textured surface or refine the shape and surfaces with spokeshaves, chisels, card scraper, files, rasps, and sandpaper. Finish is not necessary.*

Setting the blade



Set the wedge. *Start with the blade bottomed out, then pull it up 1/16 in. and set the wedge with finger pressure (above). Sighting from the back, tap the blade until it barely breaks the surface (right). Then tap the wedge to set it.*

Tap the blade laterally. *With your thumb, feel the outer margins of the blade to see if they protrude equally. Adjust by tapping the blade laterally. If the blade is too far out, retract it by rapping the back of the plane. Secure the wedge with another light tap.*

Online Extra

To watch David Finck set the blade, use his plane, and offer troubleshooting tips, go to FineWoodworking.com/extras.

5 Smart Repairs for Veneering Mistakes

How to make invisible fixes for common problems

1 BLISTERS

2 DENTS

3 END-GRAIN CHIPS

4 EDGE TEARS

5 CENTER DAMAGE

BY STUART LIPP

No matter how careful you are when working with veneer, you'll need to make the occasional repair. Veneers get chipped, scratched, dented, or blistered, and to be good at veneering, you also must be good at veneer repair. Not to worry. Just ask yourself the philosophical question: If you execute an invisible repair, did the damage ever really occur?

While my focus is on the construction process, the methods described here also can be applied to restoration, and some even work on solid wood. Keep in mind that existing glue and finish (topics I won't address here) are big factors in restoration work. Also, when building a piece, it's important to catch repairs early in the process; otherwise, construction could get in the way, such as with solid-wood edging or a frame around a panel.

Having an arsenal of remedies will get you through even the toughest of repairs, and experience will help you match the appropriate repair to the damage. I work with thin commercial veneers, but the same techniques apply to thicker, shopmade veneer.

Small repairs require a judgment call

The first thing to do with damaged veneer is judge whether a repair is necessary. Don't jump into a full-blown repair if you don't have to. A small chip or dent on the edge of a piece often disappears when you break the edges, or you can be a little heavy-handed on that spot to ensure that it does. And there is nothing wrong with using putty once in a while to fill a tiny chip, crack, or split. It requires skill to color the putty with water-soluble aniline dye powders to match the wood perfectly. This fix should be used rarely and when the damage is very small, but it can save you from cutting into the veneer when it isn't necessary.

Sometimes, to make a good repair you must first make the damage worse. A chip, loose edge, or split can be too small to repair successfully. If you try, you'll most likely fail, causing a bigger mess. The only option is to "cut back," or extend the damage into the surrounding veneer. This creates the ideal situation for a successful repair because it provides enough space on the substrate to get good adhesion and allows you to control the shape of the patch.

Choose the right glue

When choosing glue for a repair, try to match the veneer color as closely as you can. This way, if glue bleeds through the pores it will be less visible. For example, use white glue on maple, a

1 Blisters

If you're not careful spreading glue and applying clamping pressure, an air pocket may form.

Slice the blister to insert glue. *Follow a grain line, streak, or other figure to camouflage the cut (left). Lipp uses a small spatula (below) made of aluminum flashing to work glue into the pocket one side at a time.*

Clamp the repair. *Use a nonstick caul (a block wrapped in wax paper or packing tape or a piece of phenolic plywood) so you don't glue the caul to the veneer.*

THE FINISHED REPAIR

Clean up the repair. *When you pull off the block, it won't be pretty. Carefully scrape and sand off the squeeze-out to bring back bare wood. Darker woods hide this repair best.*

Photos: Anissa Kapsales

2 Dents

Dents can be difficult to disguise. Before starting any repairs, steam out the dent as much as possible.

Cut a patch to match. *As with all repairs, success depends on how well you match the new veneer to the old (above). A rubber pad between the repair and the caul (right) forces the patch into the dent.*

Clean up excess. *Carefully pare away the edges of the new veneer, then feather it in with a hard block and sandpaper.*

THE FINISHED REPAIR

Hide the repair. *When everything is smooth, you should see only a slight outline where the dent was. You can use wood crayon or dyes to draw grain lines to disguise the patch.*

tight-grained wood that is not usually stained. However, rosewood is a dark wood with open pores; white glue would bleed through and ruin it during finishing. Choose something dark instead, like urea formaldehyde glue. Also, any water-based glue can be colored with water-soluble aniline dye powders to match the wood.

Your goal should always be to minimize the visibility of the repair. You don't want to accentuate it with gluelines or glue in the pores. Keep everything as clean as possible, since even the dirt from your fingers can work into white glue and leave a dirty black line.

Slice blisters to work in glue

Blisters are small pockets where the veneer wasn't glued properly to the substrate. A veneer blister is contained; it doesn't have an opening that you can see or reach. The best way to check the size of a blister is to tap all around it with your fingernail. You've located it when you hear a high popping sound. I pencil around the perimeter of the blister so I know where to work.

Once you've located the edges of the blister, the next step is to cut thin slits in it. The number of slits you need will depend on the size of the blister (as a benchmark, I usually cut one slit down the center of a 1-in.-wide blister). Make the slit the same length as the blister to provide complete access for glue.

I use an Exacto knife, a small art spatula, and a bottle of glue that has a tiny opening. Once you are finished gluing, get good pressure on the blister as fast as you can. Whether you use clamps or weights, remember to use a hard caul so the blister glues down smooth and flat.

Fill in dents

Dented veneer can be tough to repair. Because commercial veneer is thin, scraping and sanding aren't viable options. Filling it with putty is, but the color usually doesn't match, and unless you are very good at touch-ups it will stick out. Fill the dent with glue and spread some about 1/16 in. beyond the perimeter of the dent. Lay a new piece of veneer over the glue-filled dent, put a rubber pad (available from www.mcmaster.com, or use a piece of old inner tube) and a caul over that, and apply pressure with a clamp. You want a fair amount of pressure to force the veneer into the dent, but not so much that you make a larger dent. Once everything is dry, it's easy to clean up the squeeze-out with a chisel and sandpaper.

3 End-grain edge damage

Splinters often happen when trimming back overhanging veneer that is glued to the substrate or when an edge gets caught and ripped up. Small splinters can be replicated; for larger damage, tombstone repairs are best.

SPLINTERS

Mimic the damage. *Lipp breaks several matching splinters that he'll glue into place, using a hard caul and a clamp to apply pressure.*

Trim the overhang. *Wait for the glue to dry and be careful, or you'll have to repair the repair. With a chisel, use a downward shearing motion.*

THE FINISHED REPAIR

Clean up the patch. *Light scraping and sanding should leave an imperceptible patch. Here, Lipp uses a shopmade scraper.*

Break veneer to match a splinter pattern

Splinters are chipouts that occur at the end grain of veneer. If you are lucky, the splinters will be connected but just folded up. In that case, just apply some glue to the bottoms of the splinters and clamp them back in place.

But if the splinters are lost and you can't find them after scouring your shop floor, take a matching piece of veneer and break it across its long grain to replicate the missing splinters. This may take a few breaks. To glue a splinter into place, slide it into the void so that it not only glues down to the substrate but also edge-glues to the veneer. When sliding the splinter into the void, use a bit of pressure so that it really smashes into the surrounding veneer, almost to the point of sliding under it. This will eliminate the glueline. Clamp with a nonstick caul to put pressure on the repair.

ROUND PATCH

Set up a plywood fence. *Align and clamp a fence so that it will guide a router bit directly over the damage. With the depth set to the veneer's thickness, run the router far enough along the fence to clear away the problem area.*

Make the patch. *Lipp cuts a strip to fit the width of the void, and then uses a gouge to round the top.*

Cut a tombstone over the damage

Another great repair trick I use is the "tombstone fix." I like this technique because it is quick, controlled, and very effective when the damage is relatively small, on the top of a workpiece, and close to the end. A light-duty router and a straight bit are two great tools to use when repairing veneer this way. The bearing on the router bit gives you complete control over what you remove, and the depth of the cut is easy to set to the veneer thickness.

Set up a 3/4-in.-thick plywood fence running in the direction of the grain; most of it should sit on the workpiece, with just 1 in. hanging off the end. Clamp it in place, so that a 1/2-in. straight router bit, with a top guide bearing, will run over the damage

THE FINISHED REPAIR

"Tombstone" shape is best. *This repair is better than the bird-mouth or "V" repair, because angular seams tend to show. If matched well, the curved top of this repair will disappear.*

4 Long-grain edge tears

Clamp on a template to cut away veneer damage and create an identical patch.

Score along the edge of the template. *Use the flat side of a single-bevel knife to score and cut the section. Then use a chisel to pry the damaged veneer away from the substrate.*

as the router base runs along the fence. Set the bit depth to the veneer's thickness and cut away the damaged area. Next, find a piece of veneer that matches the grain and color and cut it to ½ in. wide. Check to make sure it fits well; slightly too wide is good because you can smash it in when gluing. Cut the end of the veneer piece into a half-round to match the cutout. If you have a sharp ½-in. gouge (carving or turning), this will be easy. Test the fit of the piece. To glue, push the piece down and in to the cutout so that the seam disappears.

Make a curved template to cut veneer

What if damage occurs along one of the long-grain edges: for example, a chip or a cross-grain scratch? The dilemma is how to begin and finish the repair. Angular lines will show, especially on a repair like this where they would run across the grain.

In this situation, the best repair looks something like a section of a circle—tapering in from the edge, hitting its apex right at the damage (make sure you just clear it), and then tapering back to the edge. The patch size will depend on the position and size of the damage. You should also try to match it with the grain.

The first step is to cut out the shape you want from a piece of ¾-in. plywood and sand it smooth. Clamp the plywood template in place and cut out the damage. Now cut a piece of mating veneer to match and fill that void. Glue the piece in, and clamp it down with a hard block. This will give you a seamless repair.

Cut away an entire strip

When damage is extensive and is not close to an end or an edge, you may have to replace a strip of veneer that spans the length of the piece. Again, you'll need a router and a straight bit. My method allows you to match the cutout section precisely.

First cut a piece of plywood to a width that covers the damage and a length that overhangs the workpiece by an inch on each side. This piece represents the strip that you will rout out and the patch. Once you have it exactly where you want it, clamp it in place from each end.

Cut two more pieces of plywood, about 4 in. wide and as long as the first piece. Clamp one to each side of the center strip, keeping the clamps back far enough so that they don't interfere with the router. With a hammer, tap in these outer pieces so they tightly butt up next to the middle strip, and then tighten the clamps. Next, unclamp the inner strip and gently tap it out. That leaves you with a gap that will allow you to cut a perfectly straight and parallel strip out of the veneer. When you are finished routing, remove the clamps and plywood from the panel.

Selecting a new strip of veneer to glue into place is easy if you have the next sequential piece in the flitch. If not, choose something as close to the original as you can. Lay the center template over the veneer and clamp it. Cut the veneer by going around the plywood with a single-bevel knife, banking the flat side of the knife against the plywood. This creates a mating piece to glue into the routed area. Lay the piece into place, sliding it where it looks best and taping down one side. Once glue is applied, quickly flip the veneer down. Make sure the loose edge is in place and tape it down. Clamp a 2-in.-wide, nonstick hard caul over this repair, making sure that the caul covers the two seams. □

Stuart Lipp works at Steinway & Sons in New York City.

Create the patch and glue it in place. *Use the same template to match and cut the mating veneer (above). Mark the template and the patch for length and grain match, and then line them up and cut. Set the patch in place and tape one edge (right). This will allow you to swing the patch up (maintaining its position) and apply glue before clamping it down with a hard caul.*

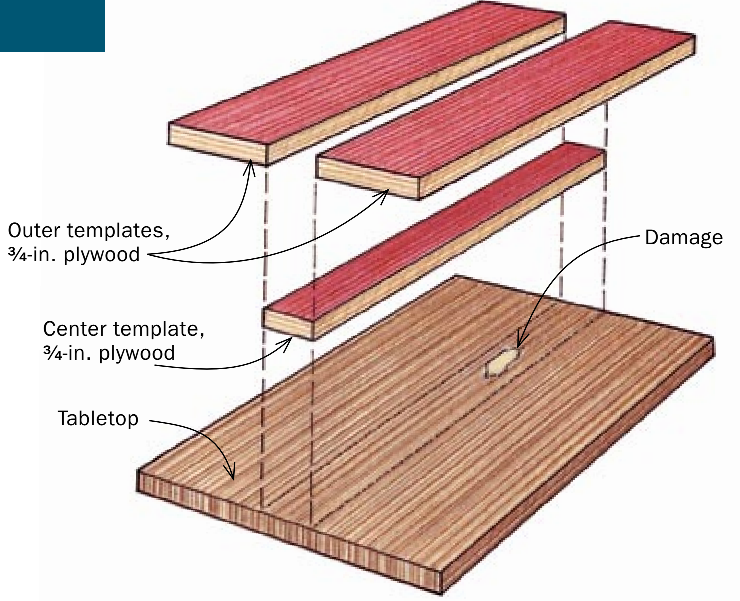
THE FINISHED REPAIR

An invisible curve and taper. *The tapering ends of this curved repair completely blend into the original veneer.*

Set up the templates. *Arrange the templates with the center piece covering the damage. Once the two outer pieces are firmly butted up to the center piece and clamped, tap out the center piece (above). With a bearing-guided router bit set to the thickness of the veneer, rout out the entire area (right).*

5 Major patches

A large area of damage, or damage located toward the center of a workpiece, requires an extensive patch.



Cut a new strip. *Clamp the center template to a matching strip of veneer and use it as a guide, cutting around it with a knife (left). Align and glue the patch. Use tape as a hinge and apply glue only in the recess (right) to prevent the veneer from expanding too soon and curling. Taping along neighboring edges (before clamping) makes cleanup easier.*

THE FINISHED REPAIR

A big patch doesn't mean a more noticeable repair. *Once dry, just a little scraping and sanding removes excess glue, revealing a barely visible restoration.*

Drawings: Vince Babak

readers gallery

CHUCK SHARBAUGH
Holly, Mich.

Sharbaugh is not afraid to turn to unorthodox sources for inspiration. He used shapes from a local steel structure near a harbor in this piece (20½ in. deep by 46 in. wide by 66 in. tall). The shapes are seen in the legs and on the insides of the doors. The drawer faces show satellite views of cities, commercial sites, subdivisions, and rural areas, all done in marquetry. The ebonized hard-maple stand uses imported and domestic veneers and is finished with non-grain-raising black stain and shellac.

R.J. SPOMER
Memphis, Tenn.

This dresser is from a bedroom set Spomer made on commission. The walnut for the carcase was salvaged from a nearby storm-damaged tree and the sweetgum drawer fronts also are local wood. The ash stand is ebonized with ferrous sulfate and logwood extract. Finished with lacquer, the piece measures 21 in. deep by 52 in. wide by 74 in. tall.

JEFF TINKER
Arvada, Colo.

Tinker's inspiration for this demilune table (13¼ in. deep by 36½ in. wide by 29 in. tall) came from Steve Latta ("Federal Card Table," *FWW* #180). Tinker concentrated the marquetry on the aprons because his wife told him she wouldn't use the table if the design was primarily on the top (it would get covered). He estimates it took him "about 9 million hours" to complete the project. The table is finished with shellac over linseed oil.

PHILLIP RECHT
West Bend, Wis.

The client who commissioned this cherry table wanted a design that would be "more formal than a table and less formal than a desk." Toward that end, Recht borrowed design inspiration from the work of Kevin Rodel. The table gets its formality from the tapered legs, thicker proportions, wide overhangs, and dark color. To offset that formality, Recht used a long, curved center stretcher. In addition, the breadboard ends of the top are chamfered to lighten the edges and reflect light. Recht finished the piece with Bartley's Jet Mahogany gel stain and gel varnish. PHOTO: JOHN JAGODZINSKI

BILLY B. McLAUGHLIN
Warsaw, Va.

McLaughlin's inspiration for this piece came from a plain-front Queen Anne highboy he saw in a client's house. He decided to reproduce the piece, modifying it with a crotch-mahogany face. McLaughlin estimates it took 340 hours to complete the highboy, which he finished with precatalyzed lacquer. The piece is 21 in. deep by 38 in. wide by 84 in. tall.

ALLEN ARNOLD
Sykesville, Md.

Arnold modeled this silver chest after an original he admired in Colonial Williamsburg. Made for his wife, the mahogany chest stands 15 in. deep by 21 in. wide by 42 in. tall. The dovetails in the drawers and the cockbeading around the drawer fronts are hand-cut. The finish is shellac.

SERGEJ KIRILOV
Schaijk, Netherlands

Kirilov designed this solid wenge table with a clever lock. In order to open the two double drawers, the decorated center pull has to be rotated to the correct position. The drawers and feet are inlaid with silver. The table, finished with urushi (Japanese lacquer), is 18 in. deep by 48 in. wide by 36 in. tall.

SETH ROLLAND
Port Townsend, Wash.

This table (21 in. deep by 60 in. wide by 36 in. tall) is the result of Rolland's experiments with steam-bending. He cut the wood partway and then steam-bent it open, holding the pieces apart with dowels. The white ash, cherry, birch, and basswood table is finished with two coats of Danish oil.

JOHN RICHARDS
Hickory, N.C.

Richards constructed this large chest of drawers from mahogany using half-blind dovetails, sliding dovetails, and mortise-and-tenon joinery. The chest, finished with shellac and lacquer, is 22 in. deep by 80 in. wide by 48 in. tall.

WILLIAM MILLER
Racine, Wis.

Miller's vessel, influenced by ancient Grecian urns, is segmented and coopered. The basswood segments are beveled on the edges and separated by ⅛-in. walnut spacers. The neck and base (made from ebony, walnut, holly, and bloodwood) are turned separately and then fit to the middle section. Miller sprayed the piece (8½ in. dia. by 8 in. tall) with lacquer. To draw the eye upward, he used a flat finish at the base, a semigloss in the center, and a gloss at the top.

GOKHAN DOGUER
Long Island City, N.Y.

This veneered display stand (18 in. deep by 24 in. wide by 52 in. tall) has five-sided legs, and it tapers to the top, creating tricky angled joinery. Doguer says the most challenging part of the piece was the glue-up, which took 45 minutes. The teak exterior is finished with wipe-on polyurethane, and the Lebanese cedar inside the cabinet is finished with shellac.

PHOTO: DAVID WELTER

Submissions

Readers Gallery provides design inspiration by showcasing the work of our readers. For consideration, send entry forms (available at www.finewoodworking.com) and photos (unaltered digital images, prints with negatives, or slides) to Readers Gallery, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470. If you want materials returned, you must include a self-addressed envelope with appropriate postage.

DAVID WESTERN
Victoria, B.C., Canada

In keeping with a 17th-century Welsh custom, Western hand-carves these one-of-a-kind love spoons as gifts for memorable occasions when a "deep degree of caring and individuality are important." Traditionally, a young man would display his skill and affection by intricately carving a soup spoon to impress a woman. Only after she accepted the spoon could the courtship begin. These maple spoons, carved from a single piece of wood, are finished with tung oil and beeswax. The spoons are approximately ¾ in. thick by 5 in. wide by 14 to 16 in. long. CENTER PHOTO: CHRIS ROBERTS

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READER SERVICE NO. 128

Q&A

Buying lumber a bit at a time

Q: I am considering building a classic highboy for my wife out of cherry, maple, or walnut. What impact would it have on the piece if, due to the cost, I bought the wood at various times throughout the project, rather than all at once?

—TOM BURNSIDE, Clinton, N.C.

A: IF YOU CAN'T BUY ALL THE WOOD for your project at once, you won't get a full set of matching boards. But if you buy the lumber wisely, you can maintain consistency within each element of the highboy at least.

First, make sure materials for the major elements are covered in your initial purchase. For your highboy, buy enough lumber that matches in grain and color to make the sides of both the upper and lower cases.

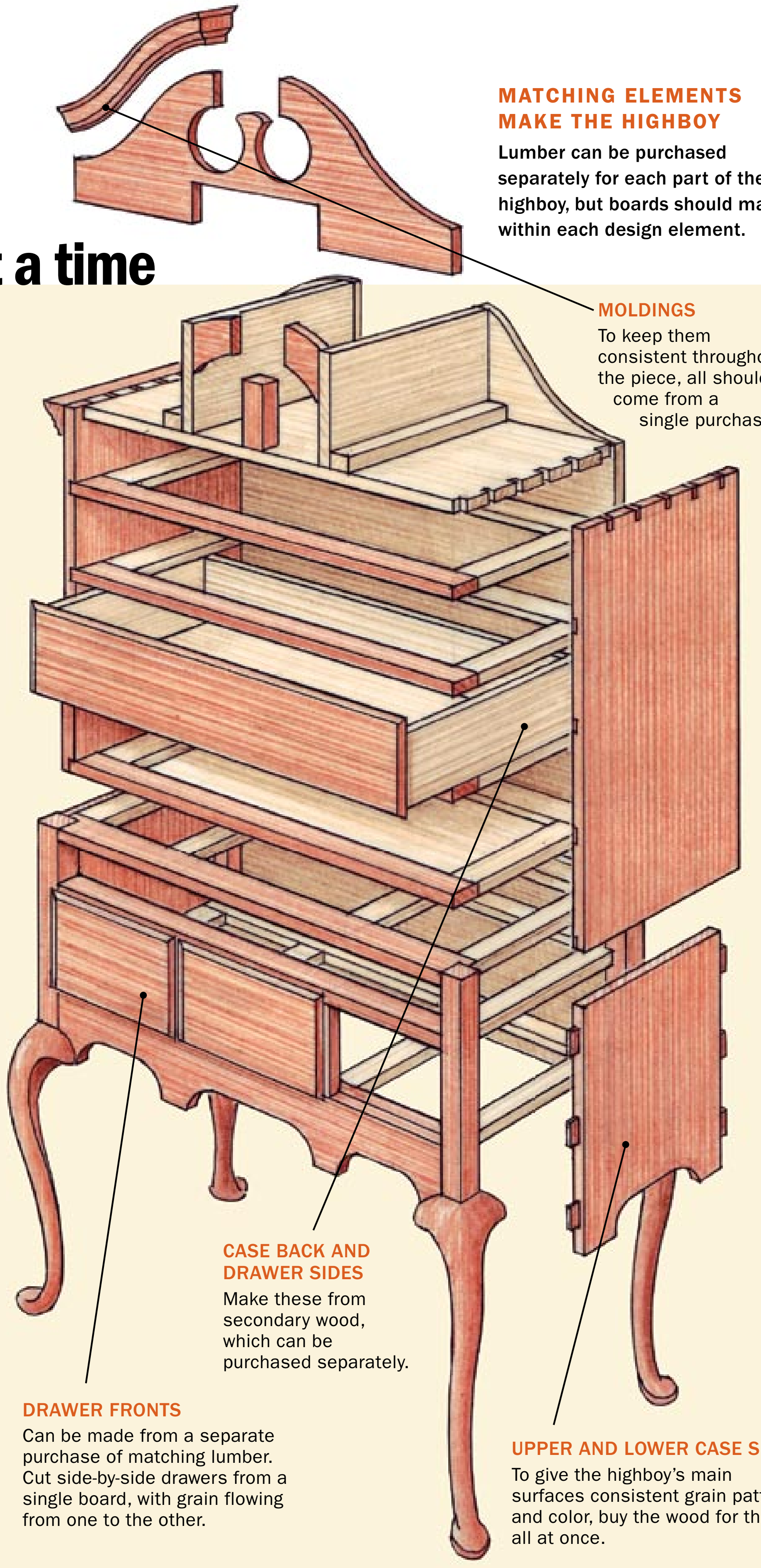
It's also essential to keep the grain and color on the facades of the two cases consistent. For both aesthetic and structural reasons, pick straight grain for these components and, if possible, make them from the same board.

You can buy drawer-front stock separately, but use extra care in selecting the boards. They should be similar in grain and color. If two drawers will sit alongside each other, cut them from the same board with the grain flowing from one front to the other.

All the molding stock should match as well, and can be bought separately. Secondary woods for the upper case interiors, the case back, and all of the drawer sides and bottoms can be purchased later.

Finally, as you build the highboy, keep the completed sections out of direct sunlight, even covered, to minimize discoloration until you can finish the entire piece.

—Steve Latta is a contributing editor.



Drawing: Vince Babak

Ask a question

Do you have a question you'd like us to consider for the column? Send it to Q&A, *Fine Woodworking*, 63 S. Main St., Newtown, CT 06470, or email fwqa@taunton.com.

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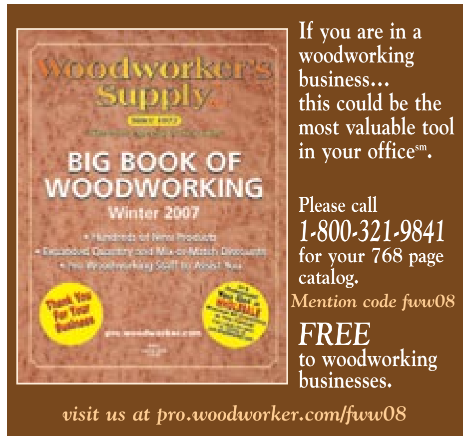

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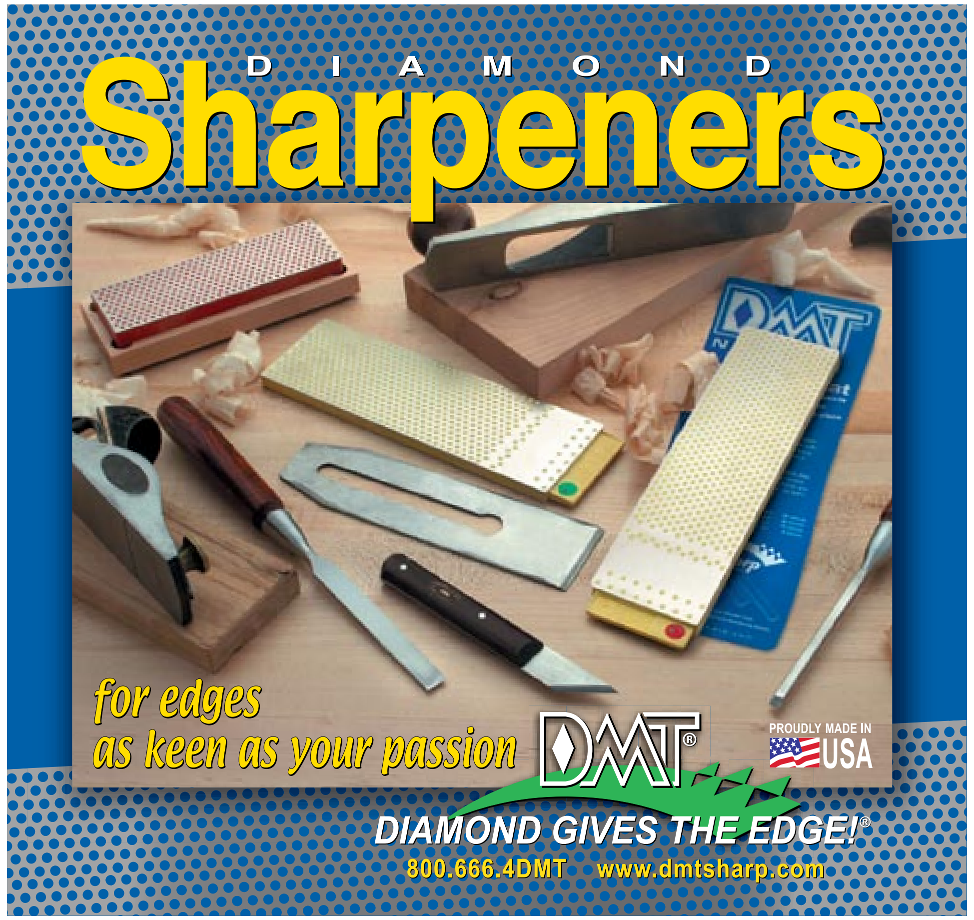


READER SERVICE NO. 126

Jig for bed-bolt mortises

Q: I would like to make Christian Becksvoort's trestle table (*FWW* #193), which uses bed bolts to attach the stretcher. These bolts require very long holes in the ends of the stretcher and a small mortise for each nut. Is there a surefire way to locate the mortises in the stretcher even if I drill slightly off line?

—DAN MORGAN, Pearl River, N.Y.

A: YES. I USE A SIMPLE JIG for bed bolts. Insert a bolt into the stretcher, and the jig hugs the bolt to align itself with the hole you drilled. The jig's dimensions are determined by the length of the bolt you use and the thickness of the post.

Make the jig from scrap. Two tabs on the underside, equal in length to the thickness of the post minus the counterbore for the bolt head, will straddle the bolt.

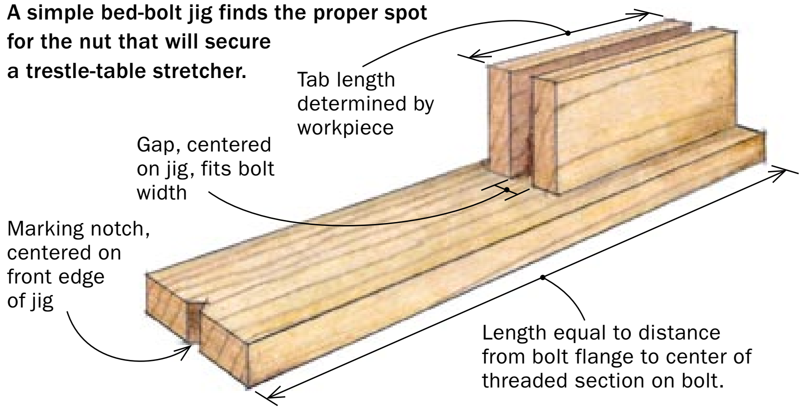
Designate a front end of the jig, insert the bolt between the tabs, then mark and cut a notch in the front edge at the point where the bolt protrudes. In use, the notch will be aligned over the bolt's centerline, and halfway along the threaded area.

Mark the stretcher at the notch to establish the nut-mortise location. Using a square, mark in the mortise dimensions, then drill and chisel out the mortise. Repeat the process for the remaining bed bolts.

—Christian Becksvoort is a contributing editor.

LOCATING A NUT MORTISE IN A STRETCHER

A simple bed-bolt jig finds the proper spot for the nut that will secure a trestle-table stretcher.



Guide the jig with the bolt. *Demonstrating with a bed rail, Becksvoort aligns the jig over the protruding bolt, brings the jig up to the rail's end, and marks at the notch, which is centered over the threads of the bolt. Then he uses a square to scribe the dimensions of the mortise that will snugly seat the bolt's nut.*

Outdoor glue for oily wood

Q: I want to build a garden bench out of ipé, and I'll have to laminate some pieces. Given the density and natural oils of ipé, what type of glue should I use? And would it help to apply acetone to the surface prior to the glue-up?

—PAUL CLARK, Springdale, Ark.

A: USE A WATERPROOF PVA GLUE. In our recent test of different glues ("How Strong Is Your Glue?" *FWW* #192), the strongest of three waterproof glues tested on ipé was Type I PVA.

For a glue to be certified by the American National Standards Institute as Type I (waterproof) PVA, the joint must survive being boiled for four hours, dried in an oven at 150°F, boiled for another four hours, and then cooled in water just prior to testing. This extreme test is designed to simulate the many cycles of hot and cold, wet and dry, that woodwork will undergo outdoors.

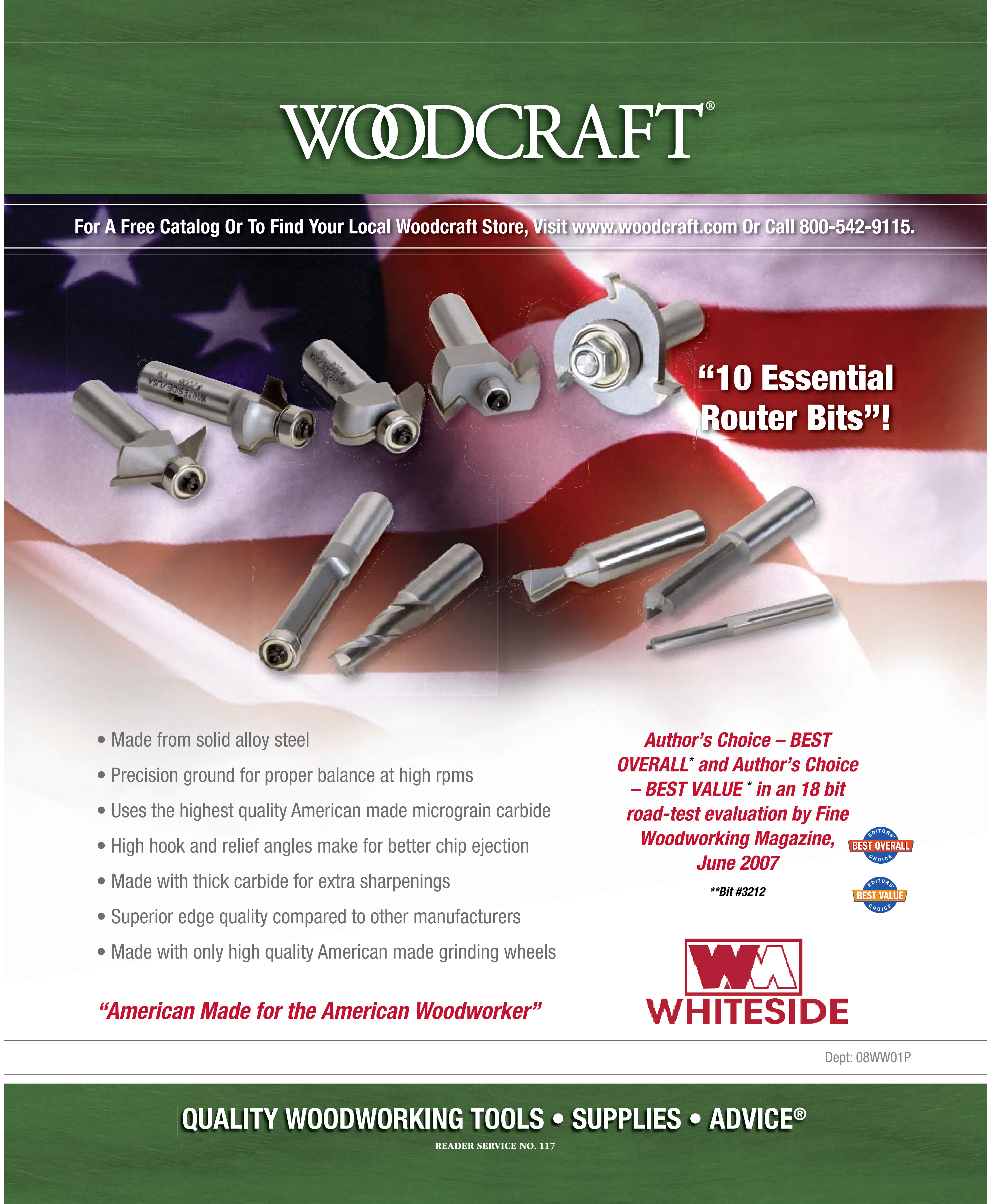
Other than choosing the right glue, there are two things you can do during glue-up to reduce the chances of joint failure.

First, rather than just wiping the surface to be glued with acetone, which can draw more oil to the surface as it evaporates, lightly sand it with P220-grit sandpaper just before applying the glue.

Second, since dense tropical woods require extra force during glue-up (see "Get Serious About Clamping," *FWW* #194), use as many clamps as you can, particularly when laminating large surfaces.

—Mark Schofield is the managing editor.

Photos: Staff; drawings (this page and p. 94): Kelly J. Dunton



Working with green lumber

Q: I am making a fireplace mantle from a cherry log that has been left outdoors for two years. The wood still seems very moist. I'd like to mill it down to 6 in. thick by 10 in. wide by 66 in. long for a single-piece mantle. Can I use this over my fireplace after I seal it?

—DAVID STAFFORD, Aurora, Ohio

A: IF THE LOG IS NOT DRY when you install it, the mantle will warp and check along its length whether you seal it or not.

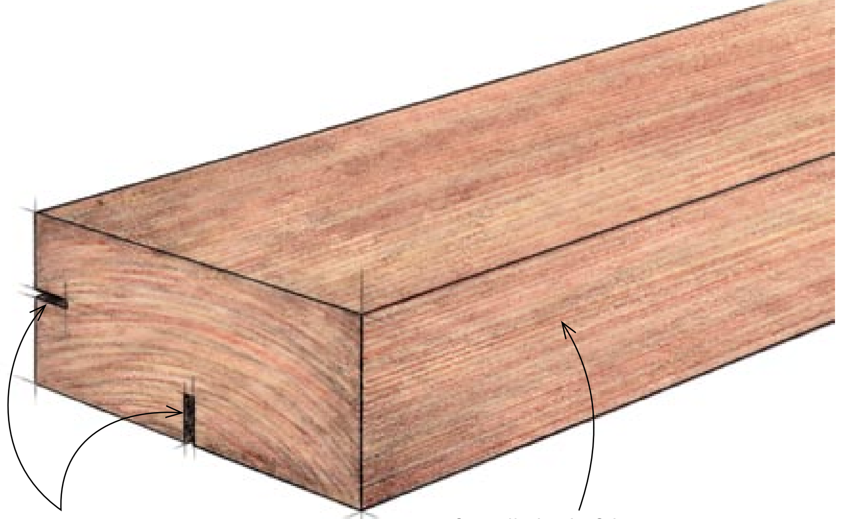
Even indoors, the log will take years to stabilize. Heat from the fireplace will only increase the problems as the exterior of the timber dries more quickly than the wetter interior.

Bring the log indoors and let it dry for as long as you can wait. Cut the initial workpiece ½ in. oversize in width and thickness and 6 in. or more in length, so you'll have enough wood to mill away when truing it up after it dries. If you can't wait until it dries slowly and completely, consider a trick that might limit checking.

Cut a sawkerf about 1½ in. deep into the center of the back edge and another in the middle of the underside, where they won't be visible. The biggest (with luck, the only) cracks will open along these kerfs.

Once you install your mantle, finish it as you would any woodwork.

—Garrett Hack is a contributing editor.



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Line-and-berry inlay

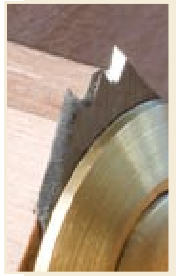
BY STEVE LATTA

A HANDFUL OF SPECIALTY TOOLS

To cut the grooves and stringing for this project, I used several tools of my own design. Enhanced versions of the prototypes shown here are manufactured by Lie-Nielsen (www.lie-nielsen.com).

For grooves, the straight-line cutter (right) has an adjustable fence that references on an outside edge. The adjustable-radius tool (front) cuts circles and arcs of varying sizes. The freehand tool (left center) rides against any guide—straight or curved.

To cut the stringing, I used a slicing gauge (rear) that works like a modified marking gauge, and a thicknessing gauge (far left) that has two adjustable blades.



Sawteeth. *The teeth on these cutters are sharpened like those on a crosscut saw, allowing the tool to cut both groove walls and clear the waste in one stroke.*

To decorate the door on my Pennsylvania spice box (pp. 58-67), I chose the line-and-berry style of inlay common on spice boxes and other 18th-century Pennsylvania furniture.

All of the motifs on the door date to this era—the central pinwheel in particular was popular among Pennsylvania Germans in Lancaster County at that time. Still, I think the various elements combine nicely to create a design that feels fresh and not outdated.

It's not necessary to decorate the back of the door, but because this was to celebrate our 10th wedding anniversary, I wanted to make the extra effort. The techniques involved are essentially the same as those used for the front. The back also features inlaid lettering, which I'll demonstrate on FineWoodworking.com.

Transfer the design to the panel

Leave the panel extra thick until the inlay is complete. Should the need arise (pray that it doesn't), any mistakes can be "erased" with a pass through the thickness planer. Of course, a lot of hard work also gets erased.

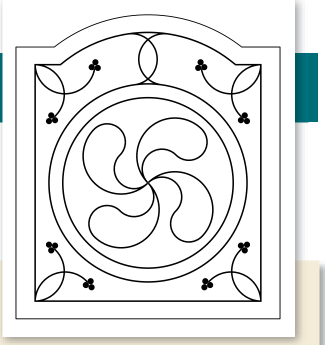
Draw the design full scale on paper, making sure to include both sides of each inlay line. These are essential to properly plot the pivot points for arcs that merge with other lines. After establishing the pattern, transfer it onto the panel. Now use a combination square to mark a short line where each corner arc will end. Set the arc so that only half the width of the line actually merges into the border. This maintains a fluid sweep all the way into the corner.

Cut a groove, then fill it

My method for setting intersecting or overlapping stringing is simple but effective: Cut a groove and fill it immediately, before cutting the next.

Lay out the pattern

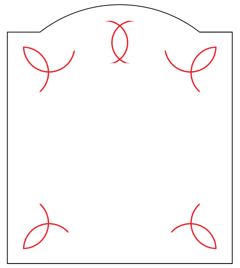
Use layout tools to transfer the design to the panel. Below, Latta marks the termination points for the corner arcs.



Online Extra

For free front and rear pattern downloads and a video on inlaid lettering, go to **FineWoodworking.com/extras.**

Start at the corners



Setting these arcs first helps ensure that they merge smoothly into the border (not shown in this drawing).

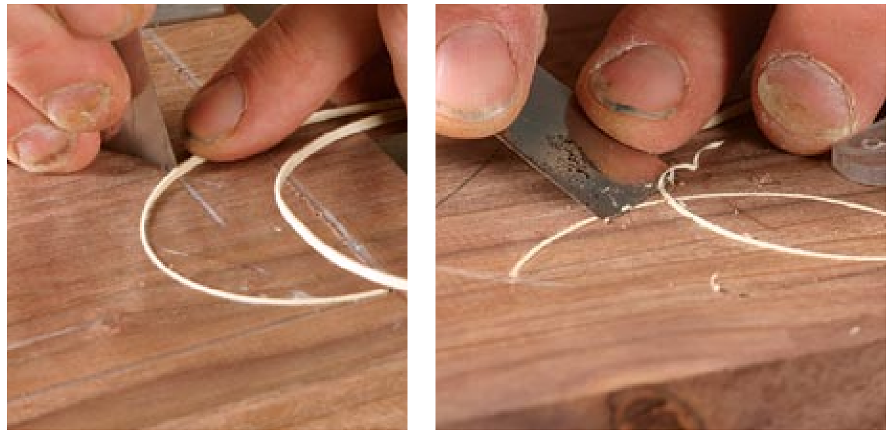
Cut the arc. *A precise groove depth isn't crucial, but aim for about 1/16 in. A sharp pivot point anchors the radius tool while the saw-tooth cutter plows the groove. The action is like that of scribing an arc with a compass, with repeated strokes in one direction.*

Yellow glue is best. *It gets tacky quickly and flows well in a narrow plastic syringe. With the curved tip, it's possible to place a fine bead of glue on each wall of the groove. The syringe is $2.60 from www.leevalley.com.*

This is especially important when it comes to arcs that merge or intersect, because the background grain at these junctions can be very fragile. Filling the first groove ensures that this grain will be supported, preventing chipout when the intersecting groove is cut. Also, since the second groove is sliced right through the first string of inlay, the two strings intersect cleanly without a lot of fussing over butt joints.

Start by cutting and filling one of the two arcs in each corner. Slice the stringing off only as needed, one string at a time. Lay a small line of glue on each wall of the groove and press the stringing into place with your fingers or the butt of a chisel. Don't press the stringing below the surface.

By the time the fourth arc is set, the first one should be dry. Use a card scraper or a wide chisel, bevel down, to cut it flush. Once this is done, you can cut and fill the second arc in each of the pairs. Afterward, lay out and cut the two intersecting arcs that connect the border to



The string doesn't have to touch bottom. *Work instead to keep it proud of the background—it's much easier to level the inlay to the surface than vice versa. Press the inlay into the groove with your fingers and trim the ends with a chisel (left) when you reach them. Then use a chisel, bevel down, to trim the string flush. If you sand, do so sparingly. Too much at this stage will create a dished, uneven surface.*

MAKE YOUR OWN STRINGING

Solid, straight-grained holly makes the best stringing. *Latta resaws stock to approximately 0.040 in. using a thin-kerf tablesaw blade and two push sticks.*

Cut the strips into strings. *Brace the work against a low fence and score it deeply with the slicing gauge. Cut the stringing wide enough to stand proud when set into the groove.*

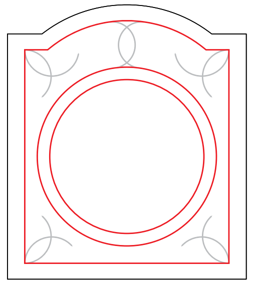
Sneak up on a snug fit. *Pull the string through the thicknessing gauge until it seats between the groove walls. If there's a lot of chatter in the cut, flip the stringing and pull from the opposite end.*

A woodworker's curling iron. *To put a bend in the holly stringing, Latta uses a burn-in knife with the spatula replaced by brass tubing. An automotive feeler gauge helps him handle the work.*

Photos, except where noted: Steve Scott; bottom left: Courtesy of Lie-Nielsen

Inlay the border and rings

The arch-top border echoes the panel's shape. Three different tools are used to cut the border and circle grooves.



Plow the straight borderlines. *The straight-line cutter's fence keeps the blade parallel to the edge. The tool acts as its own depth stop.*

Shield the surface. *The centerpoint for this arc won't fall on a future inlay line, so protect the walnut from the cutter's sharp pivot with a piece of Lexan. Drill a hole partially through the plastic to receive the point.*

Cut the upper arc. *Be sure that the blade cuts through the tops of the interlaced arcs so that they connect seamlessly with the borderline.*

Cut the short segments and clean up the corners. *Use the freehand tool against a straightedge, which is clamped to the surface, to make the grooves straight (above). Use a chisel (right) and a dental pick with a chisel tip to clear debris from the corners. A set of four dental-style carver's cleanup picks is $9.50 from www.leevalley.com.*

the inner ring. Take some time here to make sure that the curves all flow nicely together.

Install the border and cut the circles

Once all of the various lines that merge with the outer border have been inlaid, the border itself can be cut and installed. The border inlay grooves will slice through the existing inlay, again creating clean intersections with a minimum of fuss.

Use the straight-line tool to cut the bottom and side grooves, cleaning out the corners by hand. Cut the two short straight lines along the upper edge of the border by riding the freehand tool against a Lexan piece clamped to the work surface. Self-adhesive sandpaper keeps the Lexan from slipping.

When laying out the upper arc, take time to ensure it will cut directly through the top ends of the two interlacing arcs, making a nice transition. After the grooves are cut and the corners cleared out, set the stringing, mitering the corners with a sharp chisel.

After checking the pivot location to ensure a nice flow, cut the first circle with the radius tool, using Lexan attached with double-sided tape to protect the surface under the pivot. Prepare a piece of stringing. I join the ends with a scarf joint that disappears when properly executed. Before setting the string, make an angled cut on one end and line it up with the grain. Then pencil a straight reference line on the walnut to align the cut for the mating half. Inject glue all the way around and begin setting the stringing. To complete the circle, lap the free end over the scarf joint, align a chisel with the reference mark, and cut the mating half. Put in the second circle.

Repeated arcs form the pinwheel

The center pinwheel looks complicated, but it uses only four pieces of stringing. To prevent blowout of

Rotate the workpiece as you cut. *This is less awkward than walking around your bench to complete the circle. Be sure that the outer circle cuts through the bottom of the interlaced arcs, creating a seamless transition.*

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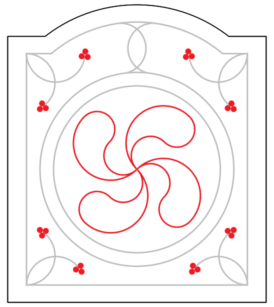
Add the pinwheel and berries

A simple combination of arcs creates the pinwheel design. The berries are clustered plugs of holly and aromatic cedar.



Lay out the pinwheel. *Use the 45° head on a combination square to mark out the axes. Then, from the centerpoint, use dividers set at 11⁄16 in. to step off four points in each direction along each axis.*

Cut the small arcs. *Latta used a shop-made tool because his Lie-Nielsen prototype won't cut a small enough radius. The production model will.*

Set the short string. *This short central piece stops where the curve changes direction. Cut the scarf so the long side of the joint is on the inside of the curve.*

Cut and fill the two large arcs. *Use Lexan to protect the surface from the pivot point (above). The long stringing segment completes the pair of pinwheel blades. Placing each scarf joint at the transition of two opposing curves takes advantage of the tension in the curled stringing. Each piece wants to uncurl toward the other, which helps hold the joint together.*

the walnut background, a logical sequence of cuts is essential. I inlay one pair of opposing blades at a time. Each pinwheel blade is made by linking two small arcs in an S-shape and then drawing a larger arc to connect the two ends.

Cut the four small arcs first, making sure they transition smoothly into one another. To prevent the background from collapsing during subsequent cuts, glue in a short piece of stringing that runs through the center of the pinwheel and fills about two-thirds of the center arc in each direction. Make a scarf-joint cut at each end. Let the glue dry, level the stringing, and then cut the larger arcing grooves, which meet in the center.

Once the larger arcs are cut, slice off a long piece of stringing and take it to width with the planing gauge. Splice it into the first scarf joint and wind it around to complete the first blade. Next, set it through the center of the wheel and then bend it in the opposite direction to complete the second blade.

Repeat the process with the other two blades.

Set the berries

For this piece, I used ¼-in. berries of aromatic cedar and holly in a traditional trio pattern. Mark the location of each berry with a circle template. Use an awl to indent the center of each circle and, using a sharp brad-point bit, drill and fill only one hole of each set at a time.

Make the plugs using any standard ¼-in. plug cutter. Glue them in and level them to the surface with a chisel. Let the glue dry thoroughly before drilling for the next adjoining berry. Start too soon, and as you drill, the walnut between the holes will flake out and look awful. □

Insert the plugs. *Level each one before the glue fully sets. That way, if a plug breaks off below the surface, it can easily be drilled out and replaced.*

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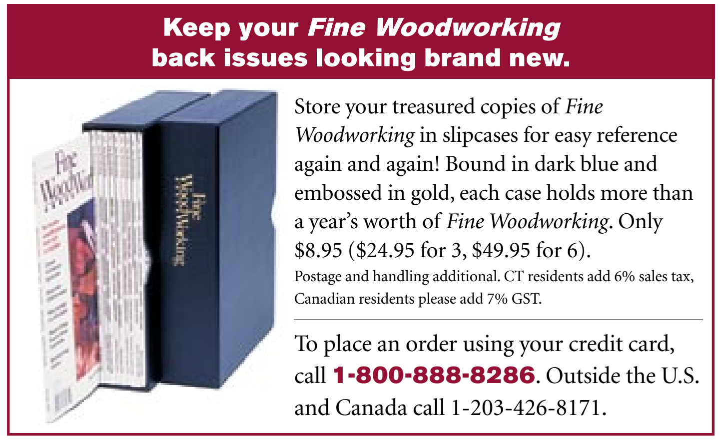

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Dyes bring out best in figured maple

BY JAMES CONDINO

If you've ever attended an outdoor custom-car show, you've noticed how some paint schemes appear to change color. That '49 Mercury appears black from a distance, but closer inspection under the sun's rays reveals a dark-purple shimmer with a subtle iridescent red.

This multidimensional, layered color is what I try to accomplish on figured maple, a wood uniquely suited to being enhanced with dyes. First, the wood's light-blond color puts no limit on your imagination (I'll stick with wood tones, but my process works just as well with other, brighter colors). Second, the striped and quilted figure becomes almost three-dimensional with added color. This is because the ripples present alternating sections of long grain and end grain to the viewer.

Prep the surface and select your colors

Your goal is to reveal the depth and clarity of the wood, so use a finely burnished scraper to remove tearout or machine marks. Vacuum fine dust particles; don't blow them into the pores.

Once you have a color scheme in mind, test it on some scrap, ideally from the same boards as the workpiece. Take careful notes on dye concentrations, color combinations, and the number of coats. I use water-soluble dye powders (www.wdlockwood.com). They penetrate the wood, giving me a margin of error if I accidentally sand through the shellac later.

The wood is alternately dyed and sanded

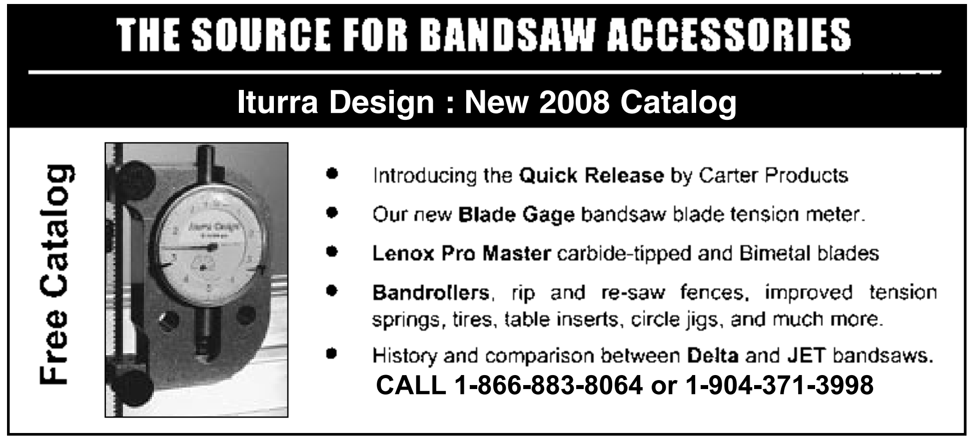
To prepare the dye, mix the powder in hot, but not boiling, water. The ratio is 1 oz. of dye to 1 qt. of water, but you'll need only a few fluid ounces of each dye. So just gradually add dye powder to the water until a maple stirring stick turns roughly the color you want. Allow the mixture to cool and then strain it through a piece of old T-shirt or a paper coffee filter.

To apply the dye, I use a pad similar to that used for French polishing. Cut out two 5-in. squares of lint-free cotton cloth (well-washed T-shirts work great). Fold one of them to form a 1-in.-wide strip, and then fold the strip into a 1-in. square. Wrap this in the other piece, and secure the ends with rubber bands

Start with a dark dye

Good preparation is key. *To avoid tearout, smooth the figured maple with a scraper rather than a handplane. If you sand, vacuum the dust thoroughly.*

Water-based dyes. *After mixing the water-based dye, strain it through a cotton cloth (above). After dampening the wood, rub in the first, dark dye (right).*



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Sand and repeat with lighter dyes

Sand back to mostly bare wood. *Use P220-grit sandpaper to remove most of the dye, leaving darker stripes in the end-grain figure, where the dye was able to penetrate deeply.*

Warm up the figure. *Apply red or dark amber to add a subtle secondary color to the figure, which will be revealed when the piece is clear-coated later.*

An overall tone is the final color. *After sanding away most of the second dye, apply a coat of yellow dye to give the whole piece a warm or antique look.*

to give you a handle. You'll need a pad for each dye, so make several. To prevent the wood from absorbing too much dye initially, I first rub the wood with a damp pad, using distilled water.

With the wood still damp, apply a very dark base coat—dark brown or, in this case, black. Dip the pad into the dye and then rub it lightly into the wood in overlapping small circles.

After the dye has dried, sand the entire surface back to natural wood with P220-grit sandpaper, leaving only the figure darkened. Repeat the wetting and dyeing, this time using a warm dark color—amber or even a dark red. Once it is dry, sand this coat back until the figured grain stands out against the natural wood. Although you won't see it until the clear finish is applied, the two dyes will come out subtly when your viewing angle changes, just like when you walked around that '49 Mercury.

You can test the finished look by wiping the surface with denatured alcohol. Be careful not to make the figure too dark and unnatural looking.

Now that you have brought out the curl and figure, apply an overall tone to the piece, perhaps yellow or light amber for an antique tiger-maple look.

Online Extra

To learn how to work with dyes to form a sunburst pattern, go to **FineWoodworking.com/extras.**

A coat of oil adds depth

After letting the piece dry overnight, the brilliant image that you created will appear somewhat dull and washed out. But don't worry; the next two steps will more than restore the appearance.

Oil and seal

Pop the curl. *Rub in a very thin coat of a drying oil to bring out the three-dimensional shimmer of the maple's figure (above). Then apply a thin, clear, glossy topcoat such as shellac (right).*

To bring out the huge curl and deep figure in the maple, apply a thin coat of walnut or boiled linseed oil. Add a few drops of oil to a pad and very gently coat the entire surface you are working on. Then wipe it off with a clean cloth. This brings out the wood's depth and luminosity, making the grain appear to move as your perspective changes.

Seal the surface with a high-gloss clear coat

The final step is to apply a clear coat to enhance the three-dimensional look of the wood. The finish needs to be as thin as possible with a high gloss. French polishing is the best method for this effect, and I urge you to try it (see *FWW* #155, pp. 38-43).

Alternatively, you can brush or spray on a few coats of super-blond shellac, or for a more durable finish, seal in the oil with a coat of dewaxed shellac, and then apply some lacquer.

The reaction from woodworkers and non-woodworkers alike when they see the finished piece will be, "Wow." □

Photos: Mark Schofield

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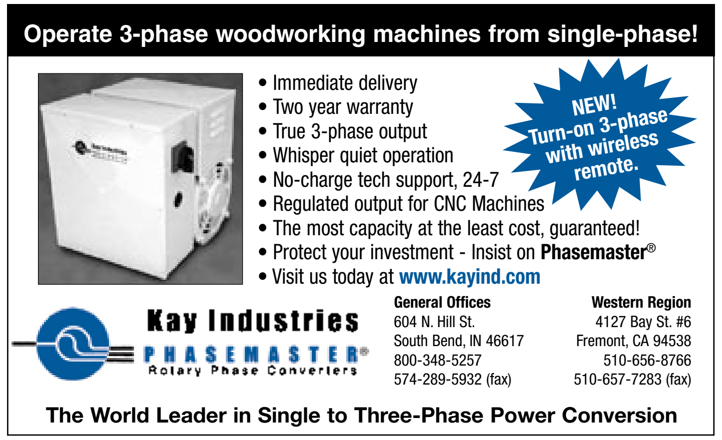

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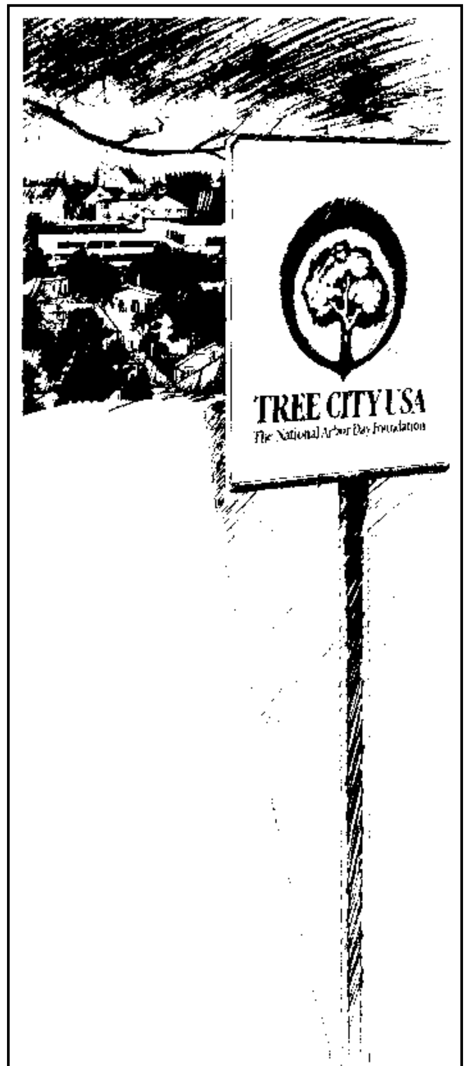
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An exploration in finishing

BY ANISSA KAPSALES

Kevin Rodel's journey into the possibilities of Arts and Crafts furniture, seen on the back cover, didn't stop at design and construction. He also ventured into new finishing methods, jin-di-sugi and ebonizing.

Jin-di-sugi is a Japanese technique ideal for woods like cedar and cypress because there is a big difference in hardness between the early growth and the later growth in each annual ring. Traditionally, wood was buried for years, then unearthed to reveal interesting decay patterns. But Rodel is experimenting with a more time-efficient method that uses fire to replicate the years of decay, revealing remarkable grooves, contours, and shapes.

Ebonizing wood is not a new process, but Rodel combines two techniques that compensate for each other's shortcomings. He used this method on the glass-topped table at right (see full table on the back cover) to enhance the jin-di-sugi finish on the cypress top rails as well as the sleek cherry parts that make up the rest of the table. □

Jin-di-sugi

Torch the surface and brush away burn marks. *Rodel uses a blowtorch with a flame spreader (above) to scorch the cypress. Too much scorching can be difficult to remove, so he keeps the flame moving. A wire brush and a little hard work remove the charred wood and the softer growth (right), leaving behind the contoured pattern of the raised hard grain, ready for a finish. This jin-di-sugi table is topped off with a light coat of linseed oil.*

Jin-di-sugi plus ebonizing

Rodel uses a two-step ebonizing method in which he applies a chemical dye solution first, then a water-based dye. The chemical solution has a tendency toward blotchiness, and the water-based dye fades with time. Used together, the two methods balance out these negative aspects, leaving a uniform finish that does not fade.

Step 1: Blacken with chemicals. *Iron reacts with tannins in wood to create a black finish, but woods such as cypress and cherry don't contain a lot of tannins, so Rodel precoats them with a mixture of 1 heaping teaspoon of tannic acid powder (www.woodfinishingenterprises.com) and 8–10 oz. of warm water (left). He then applies an iron solution (equal parts vinegar, water, and steel wool, allowed to soak for two weeks) to color the wood (right). He keeps the solution in a 24-oz. jar with a breathable lid so the explosive hydrogen gases can escape.*

Step 2: Even out blotchiness with a dye. *A coat of water-based dye (www.homesteadfinishing.com) over the iron solution creates an even, colorfast jet-black finish that can be clear-coated.*

Photos: Anissa Kapsales; John Tetreault (top)

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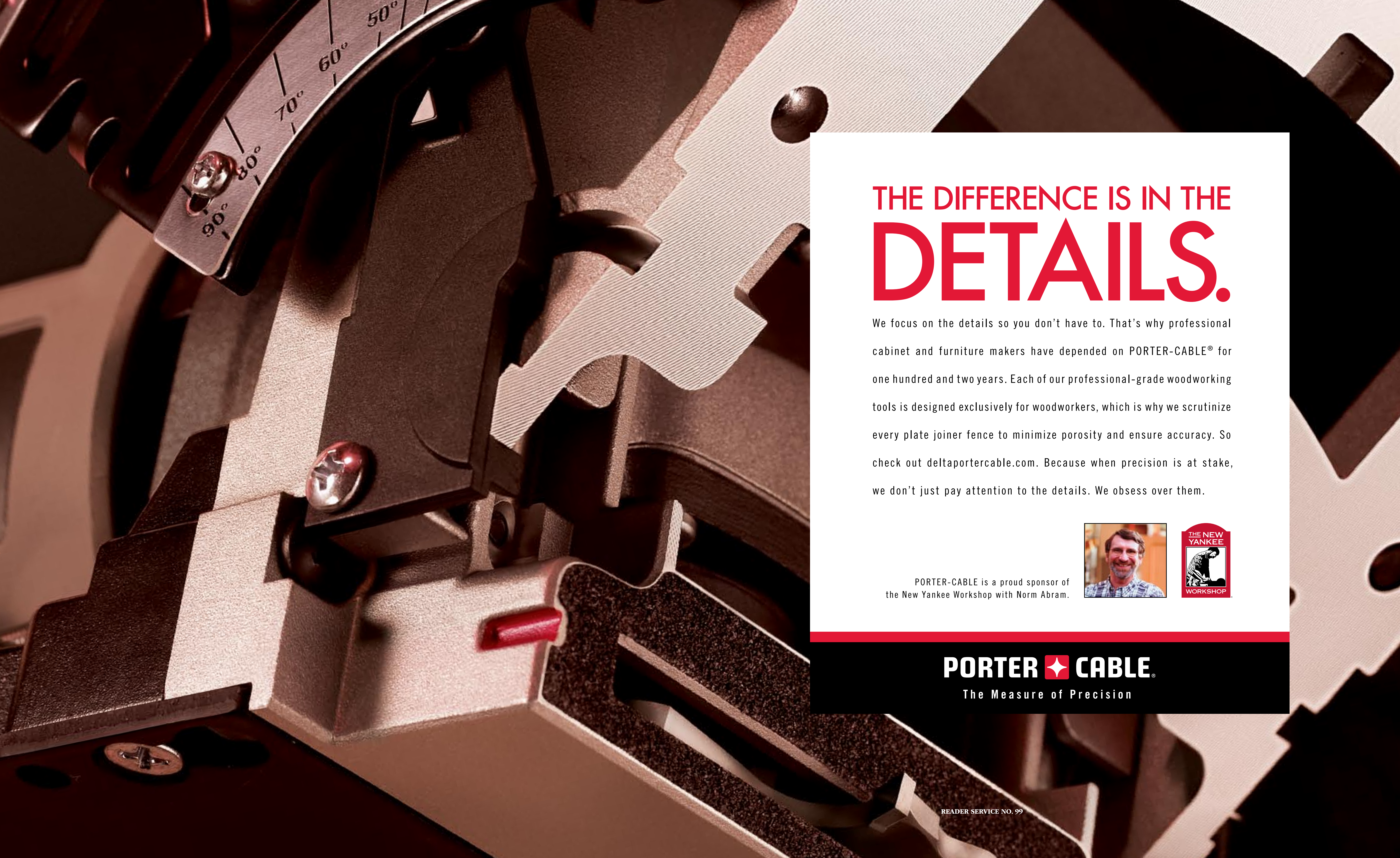
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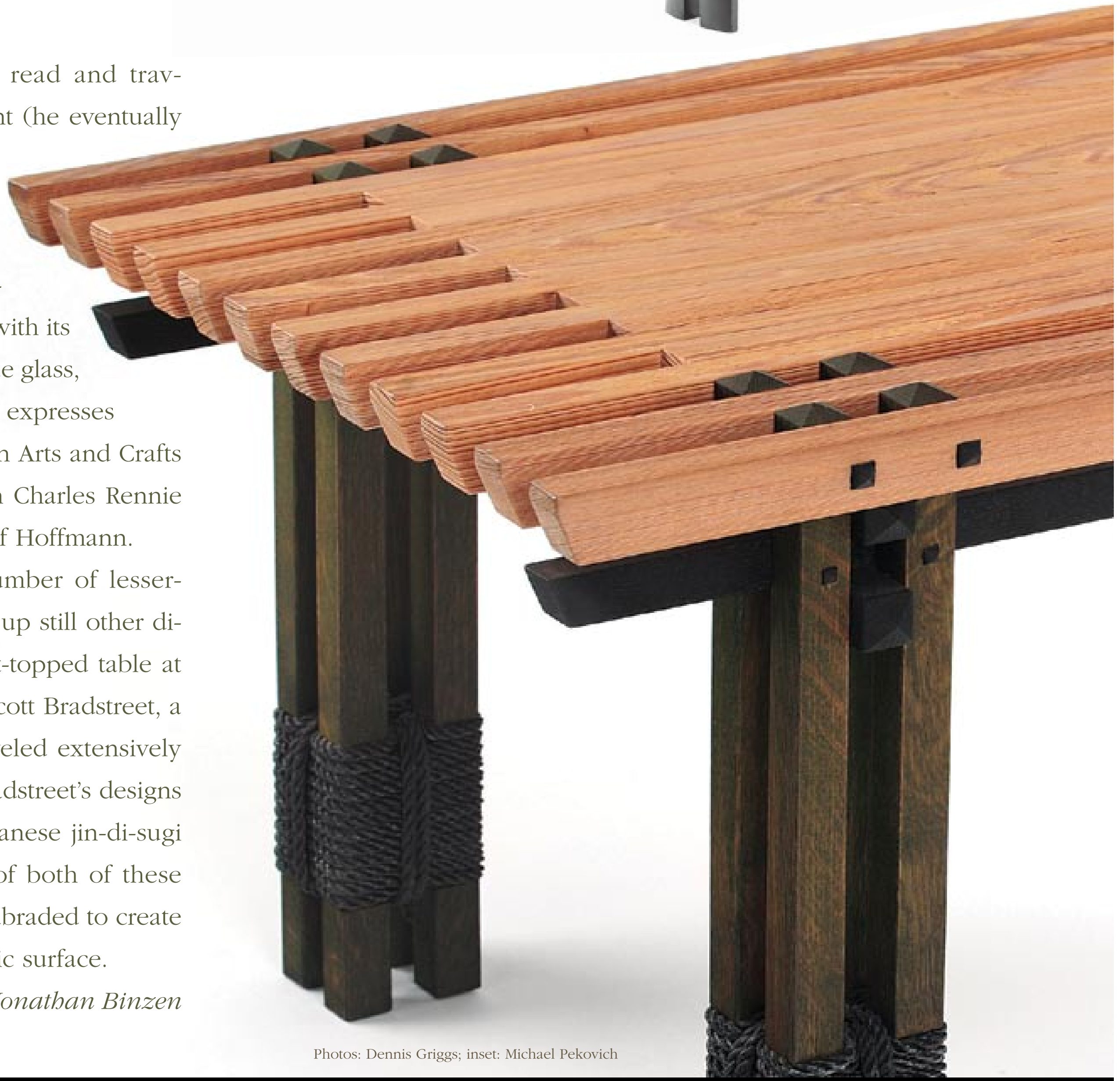
Arts and Crafts and Beyond

Kevin Rodel has been building furniture in the Arts and Crafts style since he opened his one-man shop in Maine in 1986. In his early years, he employed the vocabulary of American makers like Gustav Stickley and Charles Limbert. And he still builds plenty of furniture like the coffee table at left, with rectilinear shapes and exposed joinery that place it squarely in the American Arts and Crafts tradition.

However, the more Rodel read and traveled to explore the movement (he eventually wrote a book about it, available at www.taunton.com), the more his design horizons expanded. His recent glass-topped hall table (top right), with its stark gridwork, embedded blue glass, and smooth ebonized finish, expresses the influence of two European Arts and Crafts furniture designers: Scotsman Charles Rennie Mackintosh and Austrian Josef Hoffmann.

Rodel also turned up a number of lesser-known makers, who opened up still other directions in his work. The slat-topped table at right is his homage to John Scott Bradstreet, a Minnesota designer who traveled extensively in Japan in the late 1880s. Bradstreet's designs inspired Rodel to try the Japanese jin-di-sugi finish featured on the tops of both of these tables, in which the wood is abraded to create a deeply textured, topographic surface.

—Jonathan Binzen



Photos: Dennis Griggs; inset: Michael Pekovich

How They Did It Turn to p. 112 to learn more about how Rodel creates the jin-di-sugi and ebonized finishes on these tables.

Pro Portfolio For a narrated slide show of Rodel's work, go to FineWoodworking.com/extras.